ORDINANCE No. 2015-25

AN ORDINANCE OF THE MAYOR AND THE CITY COUNCIL OF THE CITY OF DORAL, FLORIDA, ADOPTING THE UPDATE TO THE CITY'S 20-YEAR WATER SUPPLY FACILITIES WORK PLAN, APPROVING THE WATER SUPPLY AMENDMENTS TO THE CITY'S COMPREHENSIVE PLAN, AND INCORPORATING BY REFERENCE MIAMI-DADE COUNTY WATER SUPPLY FACILITIES WORK PLAN INTO THE CITY'S COMPREHENSIVE PLAN; AUTHORIZING FOR ADOPTION TO THE FLORIDA DEPARTMENT OF ECONOMIC OPPORTUNITY; PROVIDING FOR CONFLICTS; PROVIDING FOR SEVERABILITY; AND PROVIDING FOR AN EFFECTIVE DATE

WHEREAS, Section 163.3167, Florida Statutes, requires each local government to address in its Comprehensive Plan, the water supply sources necessary to meet and achieve the existing and projected water use demand for an established planning period; and

WHEREAS, the City of Doral ("the City") recognizes the need for integration between land use planning and water supply planning; and

WHEREAS, the City of Doral recognizes the need for better integration between land use planning and water supply planning; and

WHEREAS, Section 163.3177, Florida Statutes requires that local governments prepare and adopt a Water Supply Facilities Work Plan and amend their comprehensive plans within 18 months after South Florida Water Management District approves a regional water supply plan or its update; and

WHEREAS, the South Florida Water Management District updated and adopted the Lower East Coast Water Supply Plan on September 12, 2013; and

WHEREAS, the Miami-Dade County 20-Year Water Supply Facilities Work Plan was adopted on February 4, 2015, and is incorporated in the City's Comprehensive Plan and 20-Year Water Supply Facilities Work Plan by reference, as required by Sec. 163.3177, Florida Statutes; and

WHEREAS, the City of Doral residential and non-residential uses acquire their waters directly from Miami-Dade County Water and Sewer Department; and

WHEREAS, the City of Doral proposes to adopt the necessary amendments to its Comprehensive Plan's goals, objectives and policies in order to comply with Florida Law;

WHEREAS, the City of Doral believes it is in the best interest of our residents to adopt the 20-Year Water Supply Work Plan and to include these amendments in the Comprehensive Plan; and

WHEREAS, public notice was provided as required by applicable law; and

WHEREAS, the City Council, sitting in its capacity as the Local Planning Agency, has reviewed this Ordinance and recommends approval; and

WHEREAS, after two duly noticed public hearings, the City of Doral desires to adopt this Ordinance and finds that it is consistent with the Comprehensive Plan; and

WHEREAS, the City Council finds that this Ordinance is in the best interest and welfare of the residents of the City.

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF DORAL, FLORIDA, AS FOLLOWS:

Section 1. The above recitals are true, correct, and incorporated herein by this reference.

Section 2. The City Council has reviewed the recommended amendments to the Comprehensive Plan and hereby adopts an amendment to its Water Supply Facilities Work Plan and also incorporates by reference Miami-Dade County 20-Year Water Supply Facilities Work Plan into its Comprehensive Plan as supporting data and analysis for the amendments adopted in this Ordinance. A copy of Miami-Dade County 20-Year Water Supply Facilities Work Plan is provided in Exhibit A.

Section 3. The City's proposed text amendments to the Comprehensive Plan are as follows:

Policy 1.5.1 Implement the recommendations of the City's 20 ~~10~~-Year Water Supply Facilities Work Plan adopted in 2015 ~~2010~~ and use its long-range conservation strategies as the basis to reduce water usage citywide by 16% ~~25%~~ to 126.82 ~~150~~ gallons per capita per day or lower by 2025 ~~2017~~.

Policy 1.5.5 Work with the ~~MD~~ Miami-Dade County Water and Sewer Department to examine opportunities within Doral to utilize reclaimed water on area golf courses, parks and medians, and if feasible, identify an initial public demonstration by no later than 2020.

Policy 5A.1.1 The level of service standard for potable water is as follows:

• Regional Treatment. The regional treatment system shall operate with a rated capacity no less than two percent above the maximum daily flow for the preceding year.

• User LOS. The system shall maintain the capacity to produce and deliver 126.82 ~~200~~ gallons per capita per day.

• Water Quality. Water quality shall meet all federal, state, and county standards for potable water.

Policy 5A.3.2 By September 2018 ~~2006~~, review existing water conservation regulations and revise the land development code as necessary to ensure implementation of water conservation techniques, including: a) Subsurface and other water conserving irrigation techniques; b) Florida Friendly Landscaping and Xeriscape techniques; c) Lawn watering restrictions; d) The use of low water use plumbing fixtures in all construction; and e) Any other effective methods commonly in practice or required by law.

Objective 6A.6 Potable Water Supply Planning. The City of Doral hereby incorporates by reference and shall comply with its 20-year Water Supply Facilities Work Plan (Work Plan) adopted on August 5, 2015 as required by Sec. 163.3177(6)(c), F.S. The City's Work Plan will be updated, at a minimum every 5 years within 18 months after South Florida Water Management District's approval of an updated Lower East Coast Regional Water Supply Plan. The South Florida Water Management District Governing Board approved its Lower East Coast Water Supply Plan Update on September 12, 2013.

Policy 6A.6.1 The City's Work Plan is designed to assess current and projected portable water demands, evaluate the sources and capacities of available water supplies; and identify those water supply projects, using all available technologies, necessary to meet the City's water demands.

Policy 6A.6.2. Comply with the City's 20-Year Work Plan and incorporate the Miami-Dade County 20-Year Water Supply Facilities Work Plan adopted on February 4, 2015 by reference into the City of Doral Comprehensive Plan.

Policy 6A.6.3 Coordinate appropriate elements of the Comprehensive Plan with the South Florida Water Management District's Regional Water Supply Plan adopted September 12, 2013 and with the Miami-Dade County 20-Year Water Supply Facilities Work Plan adopted February 4, 2015. The City shall amend its Comprehensive Plan and Work Plan as required to provide consistency with the District and Miami-Dade County Water Supply Facilities Work Plans.

Policy 5E.2.1 In cooperation with SFWMD and Miami-Dade County, evaluate current and projected water demands and sources for the twenty ~~ten~~-year period based on the demands for industrial, agricultural, and potable water and the quality and quantity of water available to meet these demands.

Policy 6.4.16 Coordinate with Miami-Dade County WASD to develop strategies to improve the resiliency of existing water resources in order to protect future water quality and minimize the potential for flood damage and water shortage.

Policy 9.1.21 Coordinate with Miami-Dade County, South Florida Regional Planning Council, South Florida Water Management District and other governmental entities in the development of goals, objectives, and policies to address climate change in south Florida.

Policy 9.1.22 Participate with the Southeast Florida Regional Climate Change Compact, neighboring municipalities and Miami-Dade County to make our community more climate change resilient through the adoption of strategies, policies and programs.

Capital Improvement Element. Table 10.1. Revise the User LOS - The system shall maintain the capacity to produce and deliver 126.82 ~~200~~ gallons per capita per day.

A copy of the City of Doral 20-Year Water Supply Facilities Work Plan is provided in Exhibit B.

Section 4. The City Manager or designee is hereby authorized to transmit this Ordinance to the appropriate local, regional and state agencies.

Section 5. If any section, clause, sentence, or phrase of this Ordinance is for any reason held invalid or unconstitutional by a court of competent jurisdiction, the holding shall not affect the validity of the remaining portions of this Ordinance.

Section 6. All sections or parts of sections of the Code of Ordinances, all ordinances or parts of ordinances, and all Resolutions, or parts of Resolutions, in conflict with this Ordinance are repealed to the extent of such conflict.

Section 7. If this Ordinance is approved, it shall not become effective until the State Land Planning Agency issues a Final Order determining the adopted amendment to be in compliance and in accordance with Section 163.3184(9), Florida Statutes, or until the Administration Commission issues a Final Order determining the adopted amendment to be in compliance in accordance with Section 163.3184(10), Florida Statutes.

The foregoing Ordinance was offered by Councilmember Fraga who moved its adoption. The motion was seconded by Councilmember Cabrera and upon being put to a vote, the vote was as follows:

Mayor Luigi Boria	Yes
Vice Mayor Sandra Ruiz	Yes
Councilman Pete Cabrera	Yes
Councilwoman Christi Fraga	Yes
Councilwoman Ana Maria Rodriguez	Yes

PASSED AND ADOPTED on FIRST READING this 20 day of May, 2015.

PASSED AND ADOPTED on SECOND READING this 5 day of August, 2015.

LUIGI BORIA, MAYOR

ATTEST:

CONNIE DIAZ, CITY CLERK

APPROVED AS TO FORM AND
LEGAL SUFFICIENCY FOR THE SOLE USE
OF THE CITY OF DORAL

WEISS, SEROTA, HELFMAN, COLE, & BIERMAN, PL
CITY ATTORNEY

EXHIBIT “A”

Miami Dade Water and Sewer Department

20-year Water Supply Facilities Work Plan

(2014 – 2033)

Support Data

November 2014
(Revised January 2015)

Report

Appendices

Appendix A Wellfield Data Tables
Appendix B ~~Miami-Dade County Capital Improvement Element Tables 8 and 12~~MDWASD FY 2014-2020 Capital Budget and Multi-Year Capital Plan
Appendix C Water Supply for Municipalities
Appendix D Water Use Efficiency
Appendix E Table 5 Countywide BMP Implementation Schedule, Costs, and Savings Projections from the Water Use Efficiency 5-Year Plan
Appendix F Reuse Project and Deadlines
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Appendix I MDWASD June 2014 Modification request to the 20-year Water Use Permit

Section 5
Planned Water Supply Facilities

This section details the water supply facilities that are planned in order to meet MDWASD's water demands through 2033. The County's projected finished water demands are now markedly lower than anticipated when the first 20-year water use permit application was submitted to South Florida Water Management District (SFWMD) in 2007. This demand reduction has eliminated the anticipated supply shortages which were the basis for an ambitious schedule of several costly alternative water supply projects which are no longer required or needed. Reuse projects to address water supply have been eliminated. The decrease in water demands is a result of successful implementation of the County's Water Conservation Plan and new population projections based on the 2010 Census. For ease of reference, the project start and finish dates have been provided below the title of the following subsections. ~~The Capital Improvement Elements Tables 8 and 12 located in Appendix B.~~ The adopted FY 2014-2015 Capital Plan for the two alternative water supply projects is included in Appendix B.

5.1 Alternative Water Supply Projects

The following proposed alternative water supply (AWS) projects are to meet MDWASD's water demands through 2033, which encompasses the proposed modification to the 20-year Consumptive Use Permit period. AWS projects have been identified to meet water demands in the MDWASD service area and are presented in **Table 5-1, Table 5-2** and **Figure 5-1**.

The plan described herein demonstrates that the proposed projects, by their location, volume of water produced, and timing of implementation, will be sufficient to meet the water demand increases. These projects will undergo further refinement and development over the next few months. The flow (Q MGD) shown in parentheses below represents the corresponding amount of finished water annual average daily demand (AADD) provided by the projects in terms of million gallons per day (MGD). These AWS projects and AADD assume that all current wholesalers will remain on the MDWASD system through 2033.

Table 5-1: MDWASD) Proposed Alternative Water Supply Projects From Alternative Water Supply Project Development Submitted to SFWMD June 2014

Year	Annual Average Finished Water Quantity in MGD and Source		
2013	7.5	Hialeah Floridan Aquifer RO WTP-Phase 1-a, 10 MGD & 6 Floridan Aquifer supply wells	AWS
2015	2.5	Hialeah Floridan Aquifer RO WTP-Phase 1-b, 4 Floridan Aquifer supply wells	AWS
2018	12.45	South Miami Heights WTP Phase 1(RO portion)	AWS
2030	5.0	South Miami Heights WTP Phase 2(RO portion)	AWS
Total	27.45		

WTP. Everglades Labor Camp and Newton WTPs will remain on stand-by service.

5.2 Miscellaneous Projects

5.2.1 Water Conservation/Non-Revenue Potential Water Loss Reduction Program (Up to 19.62 MGD)

Start 2006
Finish 2027

These projects serve to reduce the demand for water through demand management. They include, but are not limited to, various water conservation projects currently being implemented by MDWASD. The County's Water Use Efficiency Five-Year Plan was approved by the Board and has been expanded to cover the next 20 years with a projected reduction in demand of 19.62 MGD over that time period. Examples of ongoing conservation projects include the bathroom and kitchen retrofits program, Miami-Dade green lodging and restaurant program, , rebates for high efficiency toilets, and landscaping irrigation evaluations for residential, commercial and governmental uses. Similarly, the Non-Revenue Real Water Loss Program identified potential reductions in water demand of as much as 14.25 MGD by 2030 through demand management activities.

5.3 20-Year Work Plan and Capital Improvement Plan

As mentioned in the previous sections, the latest lower population projections based on the 2010 Census results and historically lower per capita daily finish water use have reduced the projected finish water demands which have eliminated the need for other alternative water supply projects by several years. The Alternative Water Supply projects to address water demands through 2033 include the Hialeah RO and South Miami Heights WTP.

The projects for the 20-Year Work Plan have been included in the County's adopted FY 2014-2015 Budget ~~Capital Improvement Element~~. An update to the County's Capital Improvement Element to reflect the adopted FY 2014-2015 Budget will be processed in 2015. A copy of ~~Table 12 from~~ the County's adopted FY 2014-2015 Budget ~~Capital Improvement Element~~ is contained within Appendix ~~D~~B and summarized in **Table 5-3** for the next 5 years ~~(2014 – 2018).~~ (2015-2020).

Table 5-3 MDWASD Water/Alternative Water Supply ~~CIE~~ Projects

Project Name	Expenditure[(a)]						Six Year Totals
	2012~~4~~/ 201~~3~~5	201~~3~~5/ 2014~~6~~	2014~~6~~/ 2015~~7~~	2015~~7~~/ 2016~~8~~	2016~~8~~/ 2017~~9~~	2017~~9~~/ 2018~~20~~	
Water Facilities							
South Miami Heights W.T.P. & Wellfield	4.90 ~~17.11~~	30.44 ~~46.20~~	36.48 ~~43.80~~	5.73 ~~5.19~~	15.73 ~~0.00~~	0.00 ~~0.00~~	93.28 ~~112.31~~
Hialeah Floridan Aquifer R.O.W.T.P. Phase 1 (10.0 mgd)	0.00 ~~23.79~~	0.00 ~~4.77~~	0.00 ~~1.34~~	0.00 ~~7.383~~	0.00 ~~4.08~~	0.00 ~~6.09~~	0.00 ~~47.48~~

Source: MDWASD Adopted ~~FY 2012-2013~~ 2014-2015 budget, (a) Millions of Dollars

5.4 Other Water Suppliers Future Plans

5.4.1 City of North Miami

The City of North Miami's plans for a two-phase expansion of the Winson WTP have been put on hold. The plans entailed a Phase I, to be concluded by 2010, to add an additional 8.5 MGD capacity from a Reverse Osmosis (RO) system. Phase II to add additional membrane treatment to the RO facility, which would create an additional 4.0 MGD capacity. The proposed improvements would total an increase of 12.5 MGD to the capacity of the WTP.

The City also identified that the Floridan aquifer would be the only water resource alternative for the increase in demand. Therefore, the City planned to construct an additional ten Floridan wells to supply the RO Facility. The City planned to add a raw water transmission main from the wells to the WTP.

On hold is also the third expansion plan for the addition of a 5 MG storage tank, to be located on a vacant parcel owned by the City's new Biscayne Landing development. The City may decide to forgo with the construction of the tank and utilize the parcel for another smaller RO Treatment facility or a reuse facility.

These water supply system improvements planned by the City of North Miami will provide water supply for those portions of unincorporated Miami-Dade County which are currently served by the City of North Miami.

The City is currently designing upgrades to the existing facility to maximize its efficiencies.

APPENDIX B

~~Miami-Dade County Capital Improvements Element Tables 8 and 12~~

MDWASD FY 2014-2020 Capital Budget And Multi-Year Capital Plan

MIAMI-DADE COUNTY

Delivering Excellence Every Day

MIAMI-DADE WATER AND SEWER DEPARTMENT

ADOPTED FY 2014-2020 CAPITAL BUDGET AND MULTI-YEAR CAPITAL PLAN

SEPTEMBER 18, 2014

Prepared by Capital Planning and Coordination Section

MIAMI-DADE WATER AND SEWER DEPARTMENT
2014-2020 CAPITAL BUDGET AND MULTI-YEAR CAPITAL PLAN
Projection by Project Sub-project by Year - Water

Version 4

As of: 9/30/2013

Proj	Sub-Proj	Sub-Proj Description	Current Bond/Fund Allocation	Expenditures As of 9/30/2013	Remaining Bond/Fund Allocation	PROJECTIONS 2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
1075	101546	WATER TREATMENT MODIFICATIONS TO COMPLY WITH SURFACE WATER TREATMENT AND DISINFECTANT/DISINFECTION BY PRODUCT REGULATIONS	532,824,088	13,200,885	519,623,203	300,000	1,000,000	7,500,000	20,000,000	176,682,053	180,710,573	133,430,577	0	0	0	0	519,623,203
	101891	NEW NWWF HIGH SERVICE PUMP STATION	43,250,000	0	43,250,000	0	0	1,500,000	10,000,000	15,000,000	14,500,000	2,250,000	0	0	0	0	43,250,000
		TOTAL - 1075	**585,954,088**	**13,200,885**	**572,753,203**	**300,000**	**1,300,000**	**12,200,000**	**33,300,000**	**194,762,053**	**195,210,573**	**135,680,577**	**0**	**0**	**0**	**0**	**572,753,203**
1077	101364	SOUTH MIAMI HEIGHTS WTP AND WF - NEW WATER TREATMENT PLANT	75,456,139	5,389,891	70,066,248	200,000	1,500,000	20,000,000	26,913,097	5,727,131	15,726,020	0	0	0	0	0	70,066,248
	101365	SOUTH MIAMI HEIGHTS WTP AND WF - NEW WELLFIELD	20,878,062	2,836,758	18,041,304	100,000	1,500,000	7,500,000	8,941,305	0	0	0	0	0	0	0	18,041,305
	101575	CONSTRUCTION MANAGEMENT AT SOUTH MIAMI HEIGHTS WTP	4,700,000	1,993,567	2,706,433	123,356	500,000	1,460,764	622,313	0	0	0	0	0	0	0	2,706,433
	101778	DESIGN AND CONSTRUCTION OF PROPOSED 16 INCH WATER MAIN	4,500,000	1,477,596	3,022,404	144,249	1,400,000	1,478,155	0	0	0	0	0	0	0	0	3,022,404
	102020	SOUTH MIAMI HEIGHTS FA MEMBRANES WTP	42,000,000	0	42,000,000	0	0	0	0	0	0	0	42,000,000	0	0	0	42,000,000
	102021	SOUTH MIAMI HEIGHTS - FA WELLS AND PIPING	21,600,000	0	21,600,000	0	0	0	0	0	0	0	21,600,000	0	0	0	21,600,000
		TOTAL - 1077	**169,134,201**	**11,697,812**	**157,436,389**	**567,605**	**4,900,000**	**30,438,919**	**36,476,715**	**5,727,131**	**15,726,020**	**0**	**63,600,000**	**0**	**0**	**0**	**157,436,390**
1078	101368	TELEMETERING SYSTEM - WATER	17,297,263	2,650,110	14,647,153	2,214,885	1,133,067	2,433,067	2,433,067	2,433,067	2,000,000	2,000,000	0	0	0	0	14,647,153

MIAMI-DADE WATER AND SEWER DEPARTMENT
2014-2020 CAPITAL BUDGET AND MULTI-YEAR CAPITAL PLAN
Projection by Project Sub-project by Year - Water
As of: 9/30/2013

Version 4

Proj	Sub-Proj	Sub-Proj Description	Current Bond/Fund Allocation	Expenditures As of 9/30/2013	Remaining Bond/Fund Allocation	PROJECTIONS 2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
		TOTAL - 1078	17,297,263	2,650,110	14,647,153	2,214,885	1,133,067	2,433,067	2,433,067	2,433,067	2,000,000	2,000,000	0	0	0	0	14,647,153
1080	101679	HIALEAH FLORIDAN AQUIFER R.O. W.T.P. PHASE 1 (10 MGD) - GOB IN 1065.101956	45,608,637	44,756,907	851,730	851,730	0	0	0	0	0	0	0	0	0	0	851,730
	101737	HIALEAH FLORIDAN AQUIFER R.O. W.T.P. PHASE 2 (5 MGD)	12,816,075	0	12,816,075	0	0	0	0	0	0	0	12,816,075	0	0	0	12,816,075
	101738	HIALEAH FLORIDAN AQUIFER R.O. W.T.P. PHASE 3 (2.5 MGD)	6,099,000	0	6,099,000	0	0	0	0	0	0	0	6,099,000	0	0	0	6,099,000
		TOTAL - 1080	64,523,712	44,756,907	19,766,805	851,730	0	0	0	0	0	0	18,915,075	0	0	0	19,766,805
1081	101966	INSTALLATION OF 12-INCH DIWM ON EAST DRIVE FROM NW 36 ST. TO LABARON DR.	687,042	602,944	84,098	50,000	34,098	0	0	0	0	0	0	0	0	0	84,098
		TOTAL - 1081	687,042	602,944	84,098	50,000	34,098	0	0	0	0	0	0	0	0	0	84,098
1082	101969	WATER - PIPES AND INFRASTRUCTURE PROJECTS	83,608,444	29,122,567	54,485,877	10,775,476	8,000,000	14,906,409	6,201,688	5,547,738	4,874,170	4,180,396	0	0	0	0	54,485,877
		TOTAL - 1082	83,608,444	29,122,567	54,485,877	10,775,476	8,000,000	14,906,409	6,201,688	5,547,738	4,874,170	4,180,396	0	0	0	0	54,485,877
		TOTAL - Water	4,067,616,612	410,768,117	3,656,848,495	83,880,760	119,010,688	214,146,080	255,797,526	418,171,885	403,102,053	305,885,696	1,852,270,268	2,583,540	2,000,000	0	3,656,848,496

Miami Dade Water and Sewer Department

20-year Water Supply Facilities Work Plan

(2014 – 2033)

Support Data

November 2014

Report

Executive Summary

The Update to the Miami-Dade Water and Sewer Department's (MDWASD) 20-Year Water Supply Facilities Work Plan is prepare as required by Section 163.3177(6)(c)3 of the Florida Statutes. Said statutory provision requires all local governments to adopt a water supply work plan that identifies the alternative water supply projects, traditional water supply projects and conservation and reuse measures necessary to meet projected water demand. The work plan is to be updated, at a minimum, every five years and within 18-months of an adopted update to the regional water supply plan. The Lower East Coast (LEC) Regional Water Supply Plan was adopted by the South Florida Water Management District Governing Board in September 2013.

The Water Supply Facilities Work Plan Update presents MDWASD's water supply systems and provides a plan for implementing water supply facilities, including the development of traditional and alternative water supplies necessary to serve existing and new development.

This Water Supply Facilities Work Plan Update includes the following primary sections:

- Section 1 - Introduction
- Section 2 – Water Service Area
- Section 3 – Existing Water Supply Facilities
- Section 4 – Population and Water Demand Projections
- Section 5 – Planned Water Supply Facilities
- Section 6 – Climate Change and Sea Level Rise Plan

The County's projected finished water demands are now significantly lower than anticipated when the first 20-year water use permit application was submitted to South Florida Water Management District (SFWMD) in 2007. The updated water demand projections have resulted in a 71 million gallons per day decrease by the year 2030. This demand reduction has eliminated the anticipated supply shortages which were the basis for an ambitious schedule of several costly alternative water supply projects which are no longer required or needed. As such, reuse projects to address water supply have been eliminated. However, MDWASD will be implementing a total of 117.5 mgd of

reuse to address the Ocean Outfall Legislation which includes 27.6 mgd of Floridan Aquifer Recharge and up to 90 mgd of reuse water to FPL for Turkey Point Units 5, and6.

The decrease in water demands has been a result of the successful implementation of the County's Water Conservation Plan, and new population projections based on the 2010 Census. Through 2013, a total of 11.2 mgd have been saved through the implementation of the Water Conservation Plan Best Management Practices. Additionally, Miami-Dade County has enacted water use efficiency-legislation including permanent landscape irrigation restrictions, landscape ordinances requiring Florida Friendly landscaping in new construction, in right of ways, and the installation of high efficiency plumbing fixtures in new construction

Based on the decrease in water demands, MDWASD submitted an application for modification and extension of the 20-year Water Use Permit (WUP) on June 20, 2014. The requested modification to the WUP included new population data, revised water demand projections and alternative water supply projects to support water demands through the year 2033. The alternative water supply project include a new South Miami Heights Reverse Osmosis Water Treatment Plant with a capacity of 17.45 mgd. This update to the Water Supply Plan reflects the water supply projects required per the WUP Modification request, which is anticipated to be approved by November 2014.

In addition, MDWASD's evaluation and planning for sea level rise and climate change is detailed over the planning horizon in the Work Plan. The primary concern to MDWASD water supply is salt water intrusion into the freshwater Biscayne aquifer, the primary source of drinking water in Miami-Dade County. Results of evaluation and data analysis completed to date indicate that within the next thirty years, MDWASD will be able to operate its wellfields and water treatment facilities as designed, as groundwater modeling indicates even with a high level of projected sea level rise, the wellfields will not be impacted by salt water intrusion. Further modeling is currently underway to extend the planning scenarios fifty years out, and will include climate change such as increases and decreases in annual precipitation, and extreme weather events.

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Appendix J MDWASD September 19, 2014 Response to Request For Information for the 20-year Water Use Permit Modification

Section 1

Introduction

Miami-Dade County (County) is continuing to experience growth, as it has over the last several decades. The Miami-Dade Water and Sewer Department (MDWASD) provides drinking water to approximately two million customers in the County. Because of rapid population growth, complex environmental issues and regulatory and statutory requirements, MDWASD is updating its comprehensive 20- year plan for water supply development. The previous Water Supply Facilities Work Plan was dated April 2008 and adopted by the County's Board of County Commissioners on April 24, 2008.

1.1 Background

In response to the finding that traditional water supply sources will not be sufficient to meet demands of the growing population, of industries and of the environment, the Florida Legislature enacted bills in 2002, 2004 and 2005. These bills, Senate Bills 360 and 444, significantly changed Chapters 163 Intergovernmental Programs and 373 Water Resources, Florida Statute (F.S.), to improve the coordination of water supply and land use planning by strengthening the statutory requirements linking regional water supply plans prepared by the water management districts and the comprehensive plans prepared by local governments.

Section 373.709, Florida Statutes, Section 163.3177(6)(c)3, Florida Statutes, requires that the water supply and work plan be updated within 18 months after a water management district's governing board approves an updated regional water supply plan to reflect whatever changes in the regional plan affect their local water supply and work plan. The current statutory provisions direct local governments to do the following with regard to water supply:

1. Coordinate appropriate aspects of its comprehensive plan with the appropriate water management district's regional water supply plan. [s. 163.3177(4)(a), F.S.]

2. Revise the Potable Water Sub-Element to adopt a water supply facilities work plan covering at least a 10-year planning period to meet existing and projected demand. The work plan should address those water supply facilities for which the local government has responsibility and include the facilities needed to develop alternative water supplies. The work plan should also identify conservation and reuse measures to meet future needs. [Section 163.3177(6)(c), Florida Statutes.]

3. Revise the Conservation Element to assess current and projected water needs and sources for at least a 10-year planning period. The analysis must consider the existing levels of water conservation, use, and protection and the applicable policies of the water management district, and the district's approved regional water supply plan. In the absence of an approved regional water supply plan,

the analysis must consider the district's approved water management plan. [Section 163.3177(6)(d)3, Florida Statutes.]

4. Revise the Capital Improvements Element to identify capital improvements projects to be implemented in the first 5 years of the work plan for which the local government is responsible, including both publicly and privately funded water supply projects necessary to achieve and maintain adopted level of service standards; and adopt a five-year schedule of capital improvements to include those projects as either funded or unfunded, and if unfunded, assigned a level of priority for funding. [163.3177(3)(a)4, Florida Statutes.]

5. Revise the Intergovernmental Coordination Element to adopt principles and guidelines to be used to coordinate the comprehensive plan with the regional water supply authority (if applicable) and with the applicable regional water supply plan. [163.3177(6)(h)1, Florida Statutes.]

6. During the Evaluation and Appraisal review, determine if comprehensive plan amendments are necessary to reflect statutory changes related to water supply and facilities planning since the last update to the comprehensive plan. If necessary, transmit the amendments to incorporate the statutory changes as appropriate. [Section 163.3191(1) and (2), Florida Statutes.]

7. Ensure that adequate water supplies and facilities are available to serve new development no later than the date on which the local government anticipates issuing a certificate of occupancy and consult with the applicable water supplier prior to approving a building permit, to determine whether adequate water supplies will be available to serve the development by the anticipated issuance date of the certificate of occupancy. [s. 163.3180(2)(a), F.S., effective July 1, 2005.] Local governments should update their comprehensive plans and land development regulations as soon as possible to address this water supply concurrency requirement.

This Water Supply Facilities Work Plan Update is meant to satisfy portions of the above statutory requirements (other portions are satisfied through existing policies in the County's Comprehensive Development Master Plan) as stated in Item 1 above, to coordinate with the Lower East Coast (LEC) regional water supply plan. The 2013 LEC Water Supply Plan Update was adopted by the South Florida Water Management District (SFWMD) Governing Board on September 12, 2013.

1.2 Purpose and Objectives

The purpose of this Water Supply Facilities Work Plan Update is to present MDWASD's water supply systems and to provide a plan for implementing water supply facilities, including the development of traditional and Alternative Water Supplies necessary to serve existing and new development. These water supplies were developed by first incorporating demand reductions due to conservation. In addition,

this plan incorporates information on wholesale customers and other water suppliers that provide water to portions of Miami-Dade County: the City of North Miami, the City of North Miami Beach, and the City of Homestead.

On May 2, 2014, the MDWASD and the SFWMD held a joint workshop with local governments to assist them in their efforts to prepare an update to the Water Supply Facilities Work Plan (Work Plan). MDWASD will coordinate and provide information to the local governments in Miami-Dade County to assist them in the preparation of their Work Plans Update.

The information contained within this Work Plan Update will be included in an amendment to various elements of the County's Comprehensive Plan. This Work Plan Update is to be updated and updated every five years within 18 months after the SFWMD Governing Board approves an updated LEC regional water supply plan.

This Water Supply Facilities Work Plan Update includes the following primary sections:

- Section 1 - Introduction
- Section 2 – Water Service Area
- Section 3 – Existing Water Supply Facilities
- Section 4 – Population and Water Demand Projections
- Section 5 – Planned Water Supply Facilities
- Section 6 – Climate Change

Section 2

Water Service Area

2.1 MDWASD Service Area

The MDWASD water service area contains interconnected systems and thus, for the most part, functions as a single service area. However, for the convenience of discussing existing facilities, the service area may be broken down into three subareas by water treatment facilities: the Hialeah-Preston area serving the northern part of Miami-Dade County, the Alexander Orr, Jr. area serving the central and portions of the southern part of Miami-Dade County and the South Dade area (formerly known as the Rex Utility District) serving the southern part of Miami-Dade County, shownon **Figure 2-1**.

Within the MDWASD service area, there are 15 wholesale customers. Thirteen (13) of the fifteen (15) wholesale customers have executed 20-year water use agreements, and one (1) has executed a 30-year water agreement. The water use agreement between MDWASD and the City of Hialeah is currently under negotiations. The City of North Miami Beach stopped purchasing water from MDWASD in 2008, and has a 30-year wholesale agreement with MDWASD to purchase water on an as needed basis. The City of Miami Springs is no longer a wholesale customer of MDWASD, as the water and sewer infrastructure was transferred to the County in July 2008. Table 2-1 identifies the 15 wholesale customers and the status of their large user contracts.

In addition to MDWASD, there are four other water suppliers within Miami-Dade County that provide water to parts of unincorporated Miami-Dade County and within their respective municipal boundaries. Two such water suppliers in the South Dade area are Florida City and the City of Homestead. MDWASD does not have an agreement with Florida City. Water is sold to and purchased from the City of Homestead. MDWASD purchases water from the City of Homestead to provide water to serve the Redavo area and pays retail rates. In 2010, the City of Homestead entered into a 20-year water use agreement with MDWASD to purchase up to 3 MGD to meet the demands of its retail water customers. The water furnished will be received by the City of Homestead at the interconnection point located at SW 137th Avenue and 288th Street. In the North Dade area, the City of North Miami and the City of North Miami Beach provide water to portions of unincorporated and incorporated parts of Miami-Dade County.

2.2 Hialeah-Preston Subarea

The Hialeah-Preston (H-P) subarea is comprised of dedicated low-pressure pipelines, remote storage tanks, pumping facilities and high pressure systems. This system delivers water to Hialeah, Miami Springs, the City of Miami and other portions of northeastern Miami-Dade County, shown on **Figure 2-2,**

generally north of Flagler Street. The Hialeah Reverse Osmosis (R.O.) plant was completed in October 2013 and is providing water to the City of Hialeah and unincorporated Miami-Dade County.

2.3 Alexander Orr, Jr. Subarea

The Alexander Orr, Jr. (AO) subarea is comprised of a high pressure system comprised of two major piping loops. This system delivers water to nearly all of Miami-Dade County south of approximately Flagler Street and north of SW 248th Street, including Virginia Key, Fisher Island, the Village of Key Biscayne and, upon request, to the City of Homestead, and Florida City, shown on **Figure 2-3.**

2.4 South Dade Subarea

The South Dade subarea consists of small distribution systems and storage tanks that evolved around each individual water treatment plant (WTP) within each WTP's distinct service areas. These systems deliver water to nearly all of Miami-Dade County south of S.W. 248th street and east of S.W. 197th avenue. Homestead and Florida City are within this area. Florida City provides water service within its incorporated boundaries and to a small portion of unincorporated Miami-Dade County. In addition, Florida City purchases water from the City of Homestead to service a small portion of Florida City's service area on the southeast corner of U.S. 1 and S.W. 328th Street. The City of Homestead provides water within its municipal boundary and for a portion of unincorporated Miami-Dade County including the Redavo development. This development consists of 107 homes and an approximate population of 310. **Figure 2-4** shows the current South Dade subarea.

The design of the new South Miami Heights (SMH) WTP in the South Dade subarea is underway. The SMHWTP is scheduled to come on line by December 31, 2018. Of the five existing plants in the South Dade subarea, only Everglades and Newton WTPs will remain in service on a stand-by-basis after the SMHWTP begins operations. The existing distribution and storage systems will be incorporated into the future plans. A general shift will occur in the northern boundary of the South Dade subarea once the proposed South Miami Heights Water Treatment Plant comes into service by 2018. The northern boundary will be shifted northward such that portions of the population currently within the Alexander-Orr subarea will be within the South Dade subarea. Figure 2-1 and 2-4 illustrate the boundary shift. The boundary shift will cause a general redistribution of service between the Alexander-Orr and South Miami-Dade areas, but will not have other effects on the population expected to be served by MDWASD.

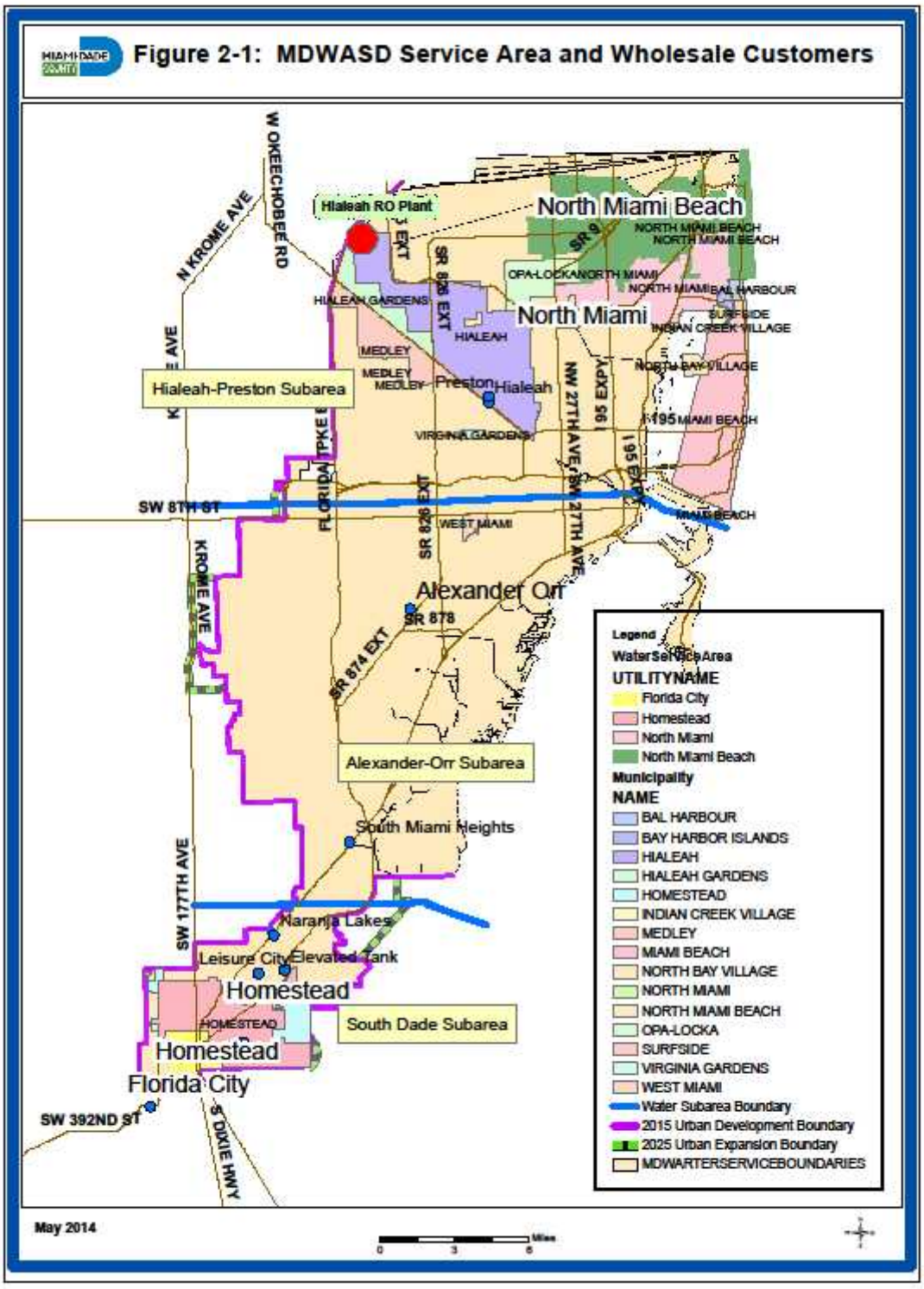
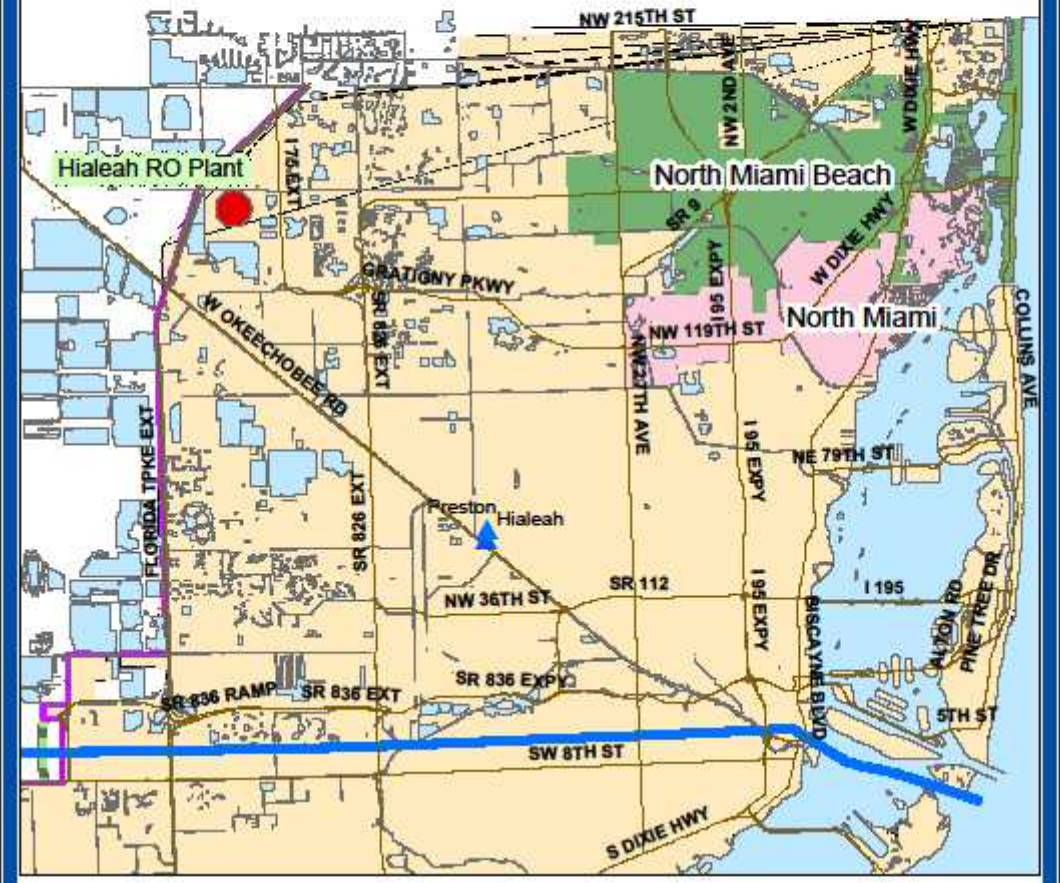


Figure 2-1: MDWASD Service Area and Wholesale Customers
Hialeah RO Plant
North Miami Beach
North Miami
Hialeah-Preston Subarea
Alexander-Orr Subarea
South Dade Subarea
Preston
Hialeah
Alexander Orr
South Miami Heights
Naranja Lakes
Leisure City Elevated Tank
Homestead
Florida City
SW 8TH ST
SW 392ND ST
SW 177TH AVE
KROME AVE
N KROME AVE
W OKEECHOBEE RD
FLORIDA TPKE
SR 826 EXT
SR 874 EXT
SR 878
SR 836
I-95
NW 27TH AVE
HIALEAH GARDENS
MEDLEY
OPA-LOCKA
NORTH MIAMI
NORTH MIAMI BEACH
BAL HARBOUR
SURFSIDE
INDIAN CREEK VILLAGE
NORTH BAY VILLAGE
MIAMI BEACH
VIRGINIA GARDENS
WEST MIAMI
S DIXIE HWY
Legend
WaterServiceArea
UTILITYNAME
Florida City
Homestead
North Miami
North Miami Beach
Municipality
NAME
BAL HARBOUR
BAY HARBOR ISLANDS
HIALEAH
HIALEAH GARDENS
HOMESTEAD
INDIAN CREEK VILLAGE
MEDLEY
MIAMI BEACH
NORTH BAY VILLAGE
NORTH MIAMI
NORTH MIAMI BEACH
OPA-LOCKA
SURFSIDE
VIRGINIA GARDENS
WEST MIAMI
Water Subarea Boundary
2015 Urban Development Boundary
2025 Urban Expansion Boundary
MDWARTERSERVICEBOUNDARIES
May 2014
Miles
0
3
6

Figure 2-2:
Hialeah-Preston Sub-Area and Water Treatment Plants



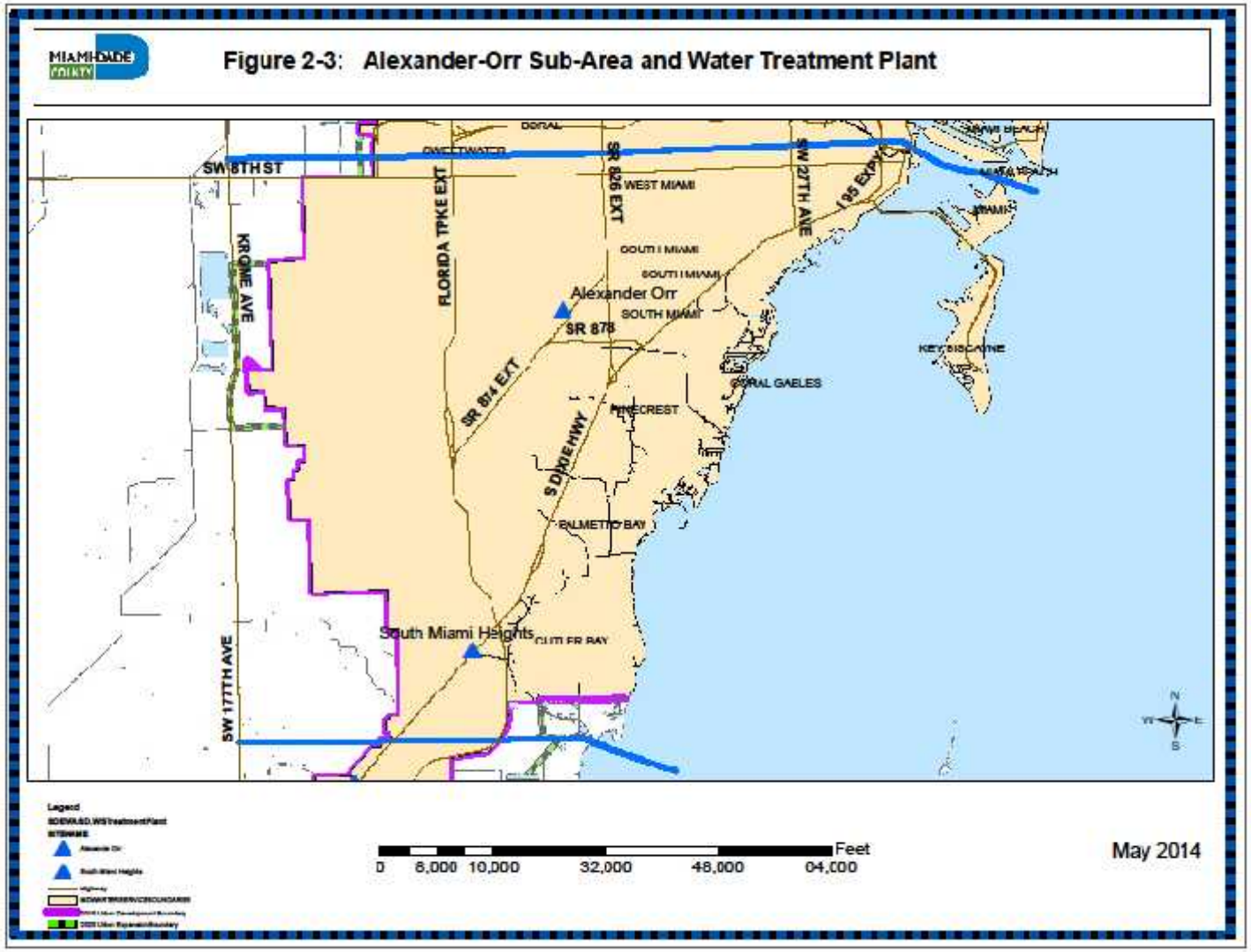


Figure 2-3: Alexander-Orr Sub-Area and Water Treatment Plant
SW 8TH ST
KROME AVE
FLORIDA TPKE EXT
SR 826 EXT
SW 27TH AVE
WEST MIAMI
SOUTH MIAMI
Alexander Orr
SR 878
SR 874 EXT
SOUTH DIXIE HWY
PINECREST
CORAL GABLES
KEY BISCAYNE
PALMETTO BAY
South Miami Heights
SW 177TH AVE
Feet
0 8,000 16,000 32,000 48,000 64,000
May 2014

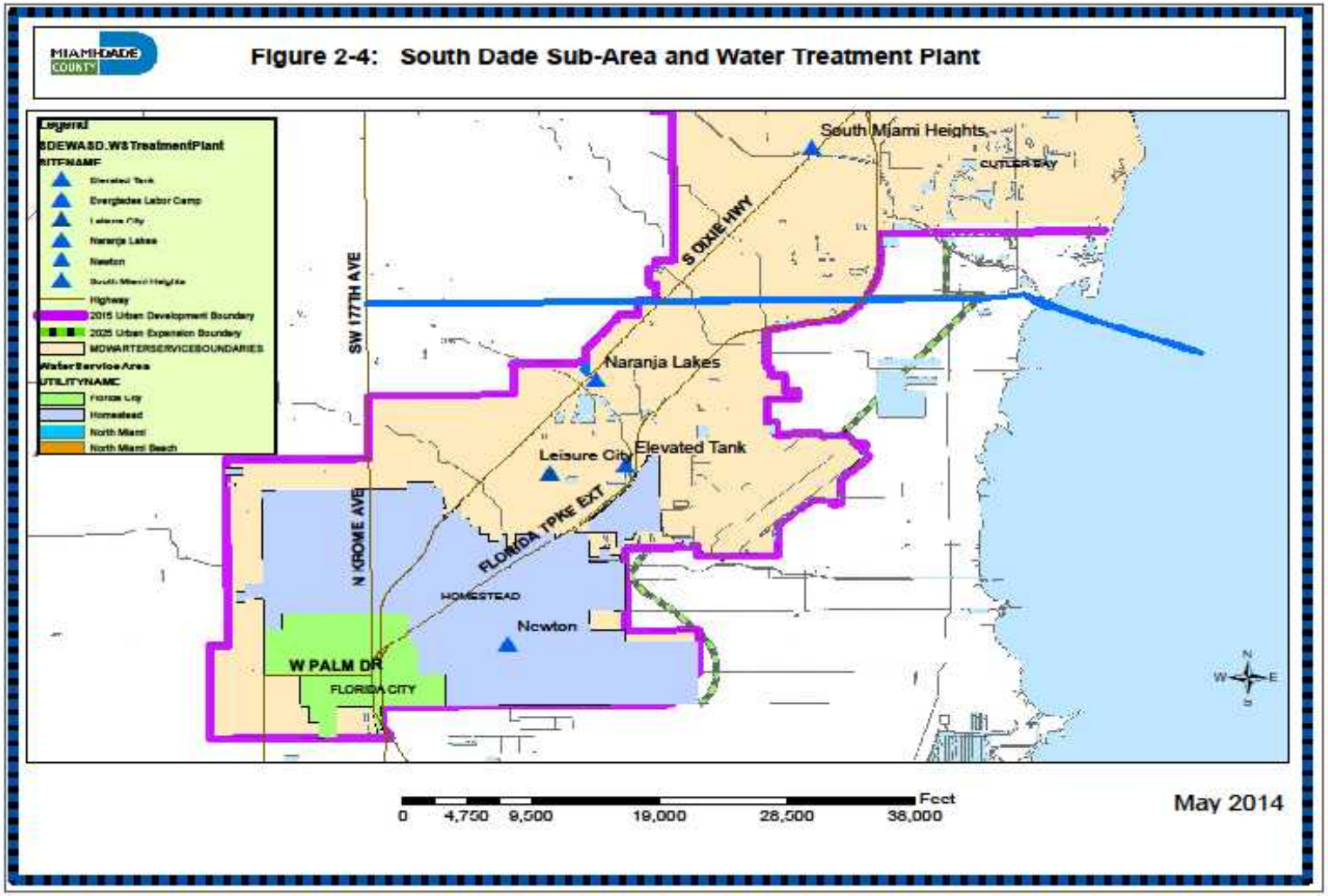


Figure 2-4: South Dade Sub-Area and Water Treatment Plant
Legend
SDEWASD.WSTreatmentPlant
SITENAME
Everglades Labor Camp
Naranja Lakes
Newton
South Miami Heights
Highway
2015 Urban Development Boundary
2025 Urban Expansion Boundary
MDWATERSERVICESBOUNDARIES
Water Service Area
UTILITYNAME
Florida City
Homestead
North Miami
North Miami Beach
South Miami Heights
CUTLER BAY
S DIXIE HWY
SW 177TH AVE
Naranja Lakes
Leisure City
Elevated Tank
FLORIDA TPKE EXT
N KROME AVE
HOMESTEAD
Newton
W PALM DR
FLORIDA CITY
N
W
E
S
0
4,750
9,500
19,000
28,500
38,000
Feet
May 2014

2.5 Wholesale Customers

Fourteen (14) of the 15 wholesale water customers within the MDWASD service area have large user agreements. One (1) wholesale water agreement with the City of Hialeah is under negotiations. These agreements, with the exception of the City of North Miami Beach, are for 20-year periods. The water agreement with the City of North Miami Beach is for a period of 30-years. In 2007, the City of Miami Springs indicated their desired to pursue the transfer of the Miami Springs water and sewer department to the County. Said transfer was approved by the Miami-Dade County Board of County Commissioners (BCC) on July 17, 2008. **Table 2-1** identifies the 15 wholesale customers and the status of their large user contracts.

As outlined in the Miami-Dade County Code of Ordinances, Chapter 2, Article XXXVII, Section 2-347, if a private or municipal water or sewer utility proposes to expand its assigned service area, the Director or designee shall determine whether or not the Department shall release the portion of the service area requested.

Table 2-1 Wholesale Water Agreements for 20 Year Period

Municipality	Status
Bal Harbour Village (BLH)	Signed, executed agreement
Town of Bay Harbour Islands (BHI)	Signed, executed agreement
City of Hialeah (CH)	20 Year agreement under negotiation. Joint participation agreement between Miami-Dade County and the City of Hialeah for the RO Plant was entered on 12/27/07.
City of Hialeah Gardens (HG)	Signed, executed agreement
City of Homestead (HOMSTD)	Signed, executed agreement; 3 MGD Max.
Indian Creek Village (IC)	Signed, executed agreement
Town of Medley (MED)	Signed, executed agreement
City of Miami Beach (MB)	Signed, executed agreement
City of North Bay Village (NB)	Signed, executed agreement
City of North Miami (NM)	Signed, executed agreement
City of North Miami Beach (NMB)	Signed, executed agreement, as needed basis
City of Opa-Locka (OPLOC)	Signed, executed agreement
Town of Surfside (SURFS)	Signed, executed agreement
Village of Virginia Gardens (VG)	Signed, executed agreement
City of West Miami (WM)	Signed, executed agreement

Source: MDWASD Water Use Permit No. 13-00017-W, Re-issue July 16, 2012

2.6 Other Water Suppliers (Non-MDWASD)

Other water suppliers located in Miami-Dade County have facilities and provide water to portions of Miami-Dade County. These facilities are located in the extreme northern and extreme southern parts of the County as shown in **Figure 2-5**. Other water suppliers within the County are:

- City of North Miami
- City of North Miami Beach
- Florida City
- City of Homestead

The Florida Keys Aqueduct Authority (FKAA) has facilities in the southern part of the County to serve Monroe County. These facilities include supply wells, a treatment facility and a transmission main to serve Monroe County.

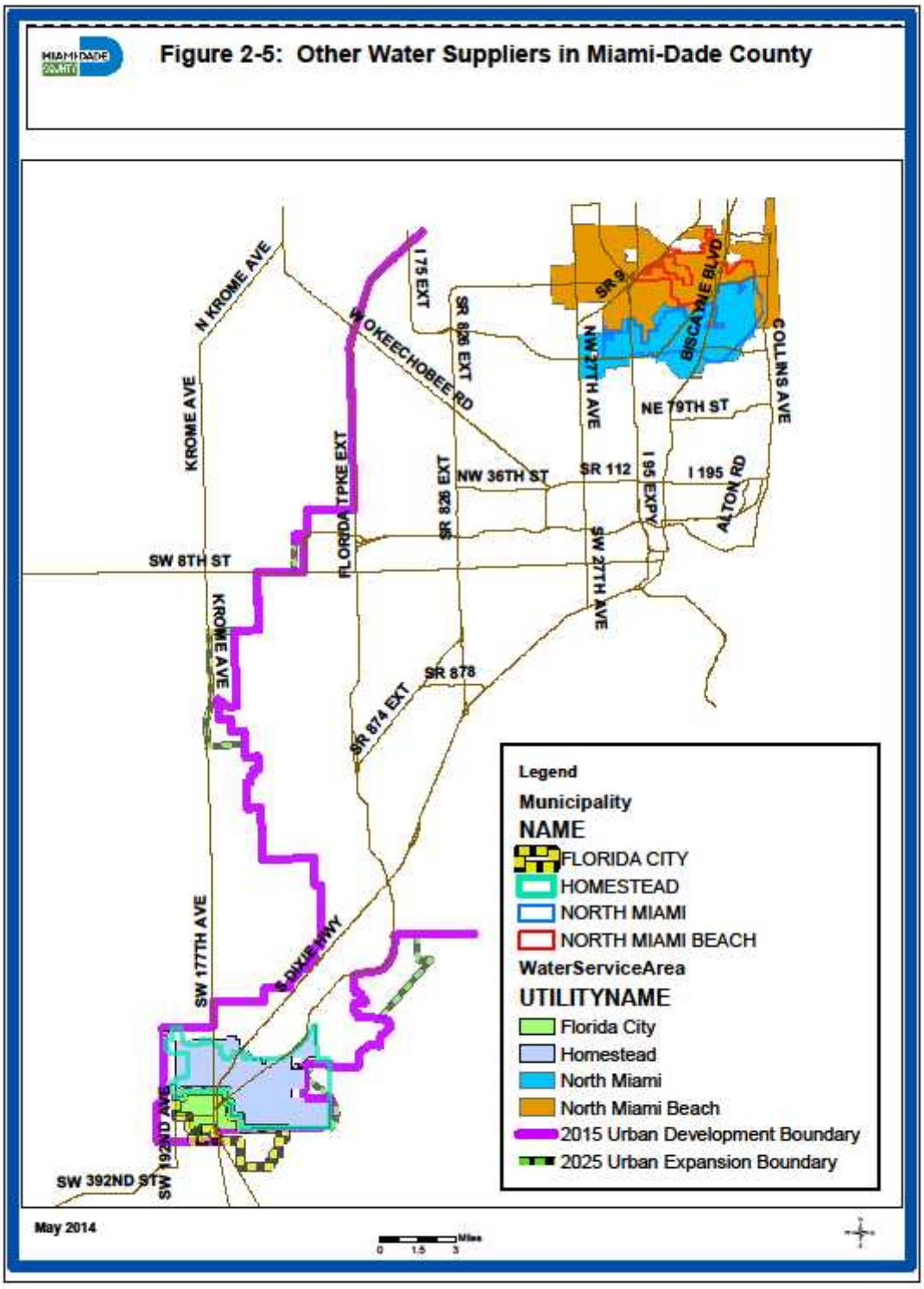
2.6.1 City of North Miami

In the northern part of the County, the City of North Miami provides water service to parts of northern Miami-Dade County within its municipal boundaries, as well as outside of its municipal boundaries extending into the northwestern parts of unincorporated Miami-Dade County.

The City's service area consists of a high pressure distribution system comprised of three main distribution lines, which are interconnected. The service area is generally bounded by NE 163rd Street to the north, Biscayne Bay to the east, NW 105th Street to the south, and NW 27th Avenue to the west. It serves a population of over 91,000 people in a 13 square-mile area, servicing the City of North Miami, the Village of Biscayne Park, small area of Miami Shores, and parts of unincorporated Miami Dade County. The City currently purchases approximately 37% of their water needs from MDWASD.

2.6.2 City of North Miami Beach

In the northern part of the County, the City of North Miami Beach provides water service to parts of northern Miami-Dade County within its municipal boundaries, as well as outside of its municipal boundaries extending into the northeastern and northwestern parts of unincorporated Miami-Dade County. The City of North Miami Beach provides service entirely or to portions of the City of Aventura, Town of Golden Beach, City of Miami Garden, and City of Sunny Isles Beach. The City of North Miami Beach has emergency interconnections with Bal Harbor Village, City of Hallandale Beach, and City of North Miami.



The City's distribution system consists of a high pressure system, distributing

potable water service to more than 163,962 people in northeast Miami-Dade County, specifically servicing the City of North Miami Beach, City of Miami Gardens, City of Aventura, City of Golden Beach, and City of Sunny Isles Beach and some areas of unincorporated Miami-Dade County. The service area is generally bounded by the Snake Creek Canal and Ives Dairy Road to the north, NW 37th Avenue to the west, NE and NW 135th Street to the south, and Collins Avenue to the east. Only about 25 percent of the City system's service area is within City limits.

2.6.3 City of Homestead

The City of Homestead provides water within most of its municipal boundaries and to a small part of southern Miami-Dade County including a portion of Florida City and parts of unincorporated Miami-Dade County. The City of Homestead sells water to MDWASD to serve a portion of unincorporated Miami-Dade County in a development consisting of 107 homes. This development, named Redavo, has an estimated population of 310. Currently, the City of Homestead and Miami-Dade County have an agreement.

Pursuant to the terms of a Consent Decree between the City of Homestead and the SFWMD, dated December 7, 2009, the City is required to reduce its withdrawl from the Biscayne Aquifer by approximately 3 MGD to meet the conditions of the City's Water Use Permit. On July 9, 2010, the City of Homestead entered into a 20-year water wholesale agreement with MDWASD to purchase up to 3 MGD of water to meet the demands of its retail customers.

In addition, MDWASD provides some water service within portions of the municipal boundary of the City of Homestead. Furthermore, the City of Homestead sells water to Florida City to service a small portion of Florida City's service area on the southeast corner of U.S. 1 and S.W. 328th Street.

The City of Homestead's service area comprises a high pressure water distribution system that services approximately 10,240 acres in southern Miami-Dade County, with an estimated present population of over 65,000. The service area is generally bounded by SW 296th Street to the North, SW 137th Avenue to the east, SW 344th Street to the south, and SW 192nd Avenue to the west.

2.6.4 Florida City

In the southern part of the County, Florida City provides water service to parts of southern Miami-Dade County within its municipal boundaries and to a small portion of unincorporated Miami-Dade County. The City's service area is comprised by a high pressure distribution system that services approximately 1,520 acres in southern Miami-Dade County. The service area has a current population of over 9,700, and is generally bounded by SW 328th Street to the north, SW 172nd Avenue/SW 167th Avenue to the east, SW352nd Street/SW 360th Street to the south, and SW 187th Avenue to the west.

2.6.5 Florida Keys Aqueduct Authority

The Florida Keys Aqueduct Authority (FKAA) has facilities in the southern part of the County to serve Monroe County. The FKAA does not provide service within Miami- Dade County, despite some of their water supply, treatment, and transmission facilities being located within Miami-Dade County. These facilities include supply wells, a treatment facility and a transmission main to serve Monroe County.

2.6.6 Large and Small Public Water Supply Systems

Additional public water supply systems within Miami-Dade County exist. Miami-Dade County has conducted a preliminary survey of these public water systems. A list of these public water supply systems provided by the State of Florida Department of Health is contained in Appendix G.

Section 3

Existing Water Supply Facilities

3.1 Water Supply Wellfields (Sources of Water)

The MDWASD water system is currently served by the previously mentioned three large treatment plants, the new Hialeah Reverse Osmosis (RO) Water Treatment Plant (WTP), and the five (5) smaller treatment plants in the southern portion of Miami-Dade County. The existing water supplies serving these treatment plants originate from two major aquifer systems in Miami-Dade County: the Surficial and the Floridan Aquifer Systems. The Surficial Aquifer System, also known as the Biscayne Aquifer, is the major source of drinking water and occurs at or near the land surface in most of the County, and is the principal water-bearing unit of the Surficial Aquifer System in the region (Causaras, 1987). Groundwater from the Floridan Aquifer (FA) is the drinking water source for the new Hialeah RO WTP.

The 20-Year Water Use Permit (WUP)for Miami-Dade County was approved by the SFWMD Governing Board on November 15, 2007. Subsequent modifications were issued, with the latest one dated July 16, 2012. The water use permit limits the annual allocation to 149,906 million gallons (MG) and the maximum monthly allocation to 13,117 million gallons until the permit expires on December 31, 2030. These allocations are further limited by the wellfield operational plan described in Limiting Condition 27 of the water use permit. A copy of the approved water use permit and limiting conditions is located in Appendix H.

On June 20, 2014 the MDWASD submit an application for modification and extension of the existing WUP. Said modification includes new water demand projections based on 2010 population data and revised alternative water supply and reuse projects.

3.1.1 Wellfields and Capacities

The existing MDWASD water supply system is comprised of eight (8) major Biscayne Aquifer wellfields in the Hialeah-Preston and Alexander Orr, Jr. subareas, twelve (12) Biscayne Aquifer water supply wells located at five individual water systems (formerly Rex Utility District water system) in South Dade County and the ASR wells at the Alexander Orr, Jr. Subarea, as shown in **Table 3-1, Table 3-2** and **Figure 3-1**. Each of the wellfield is described below.

3.1.2 Hialeah-Preston Subarea Wellfields

The Hialeah-Preston WTPs are supplied by four water supply wellfields, shown on **Figure 3-1**. The total designed installed capacity from the four wellfields in the Hialeah-Preston subarea is approximately 295 million gallons per day (MGD). Appendix A provides detailed information about well construction and capacities of the Hialeah-Preston area wellfields.

The new Hialeah RO WTP is supplied by six (6) FA wells, as noted on **Figure 3-2.** The total installed capacity for the six wells is 12 MGD. A total of four (4) additional FA wells wi+ll be constructed with a total capacity of 8 MGD. The City of Hialeah is in the process of bidding the four wells and are scheduled to be completed by April 2015.

In addition to these wellfields, four abandoned wells at a Medley Wellfield have been rehabilitated and would be available on a stand-by basis in the event of an emergency.

Table 3-2 Floridan Aquifer Wellfield Data

Wellfield	Wellfield Data	
	Design Capacity (mgd)	**Number of Wells**
Alexander Orr WTP (use of FA Wells for ASR)(c)		
Southwest	10.00	2
West	15.00	3
Subtotal	25.00	**5**
Hialeah RO WTP (use of FA Wells for RO)		
Hialeah RO (b)(d)	12.00	6
Future Hialeah RO(a)(d)	8.00	4
South Miami Heights WTP (Future use of FA Wells for RO))(c)		
Future South Miami	24.00	7
Existing MDWASD System Total (Floridan Aquifer)	**37.00**	**11**
Future MDWASD System Total (Floridan Aquifer)	69.00	22

(a) Proposed wells
(b) Hialeah RO WTP (Phase 1, 10 mgd by 2015;
(c) Source: MDWASD Water Use Permit No. Re-issue 13-00017-W, July 16, 2012
(d) Source: MDWASD Water Use Permit No. 13-00017-W proposed modification, June 2014

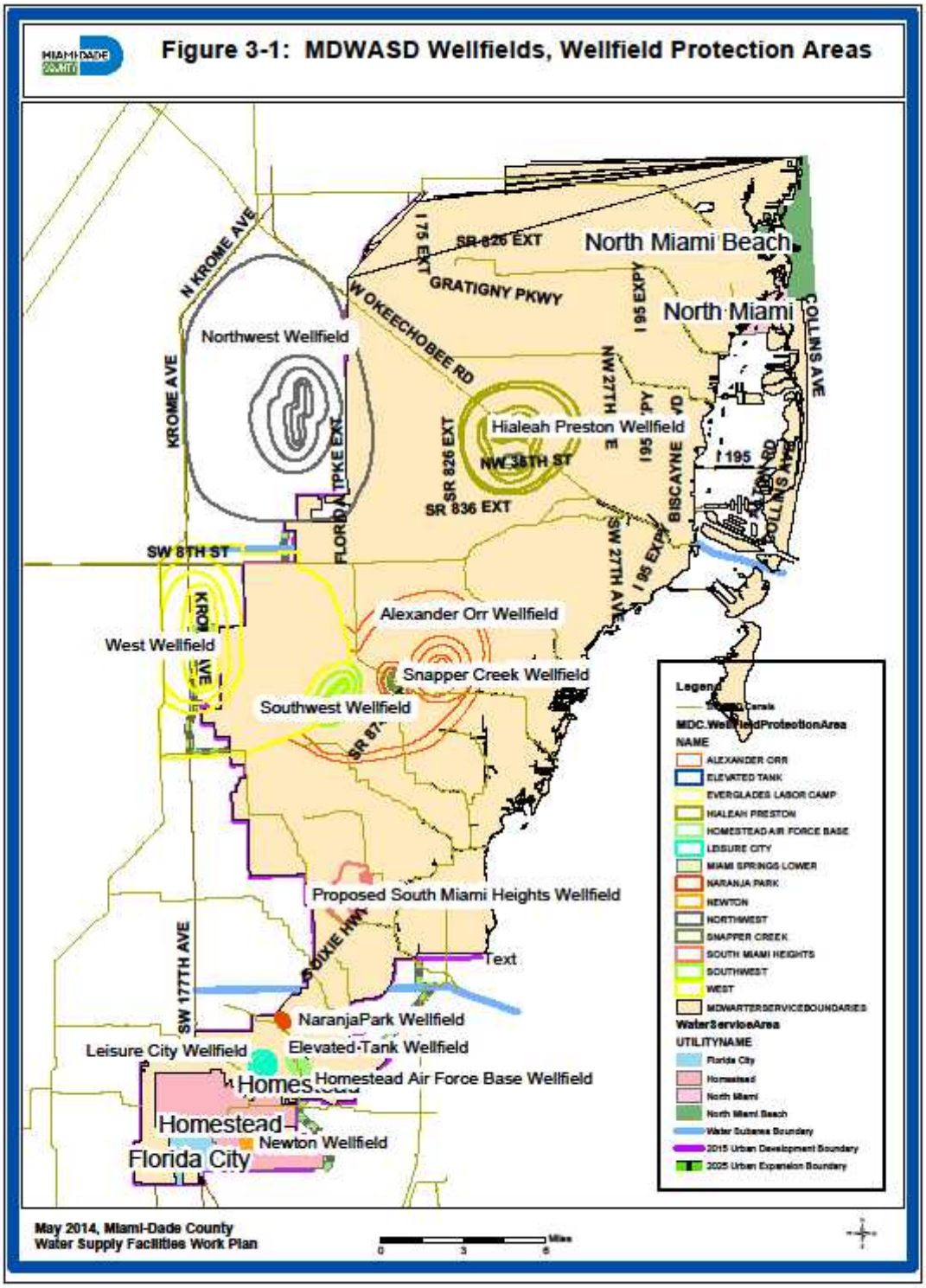


Figure 3-1: MDWASD Wellfields, Wellfield Protection Areas
North Miami Beach
North Miami
Northwest Wellfield
Hialeah Preston Wellfield
Alexander Orr Wellfield
West Wellfield
Snapper Creek Wellfield
Southwest Wellfield
Proposed South Miami Heights Wellfield
NaranjaPark Wellfield
Leisure City Wellfield
Elevated Tank Wellfield
Homestead Air Force Base Wellfield
Homestead
Florida City
Newton Wellfield
N KROME AVE
KROME AVE
W OKEECHOBEE RD
GRATIGNY PKWY
SR 826 EXT
SR 836 EXT
NW 36TH ST
SW 8TH ST
SW 27TH AVE
SW 177TH AVE
COLLINS AVE
BISCAYNE
I 195
I 95 EXP
Legend
NAME
ALEXANDER ORR
ELEVATED TANK
EVERGLADES LABOR CAMP
HIALEAH PRESTON
HOMESTEAD AIR FORCE BASE
LEISURE CITY
MIAMI SPRINGS LOWER
NARANJA PARK
NEWTON
NORTHWEST
SNAPPER CREEK
SOUTH MIAMI HEIGHTS
SOUTHWEST
WEST
WaterServiceArea
UTILITYNAME
Florida City
Homestead
North Miami
North Miami Beach
2015 Urban Development Boundary
2025 Urban Expansion Boundary
May 2014, Miami-Dade County
Water Supply Facilities Work Plan
Miles

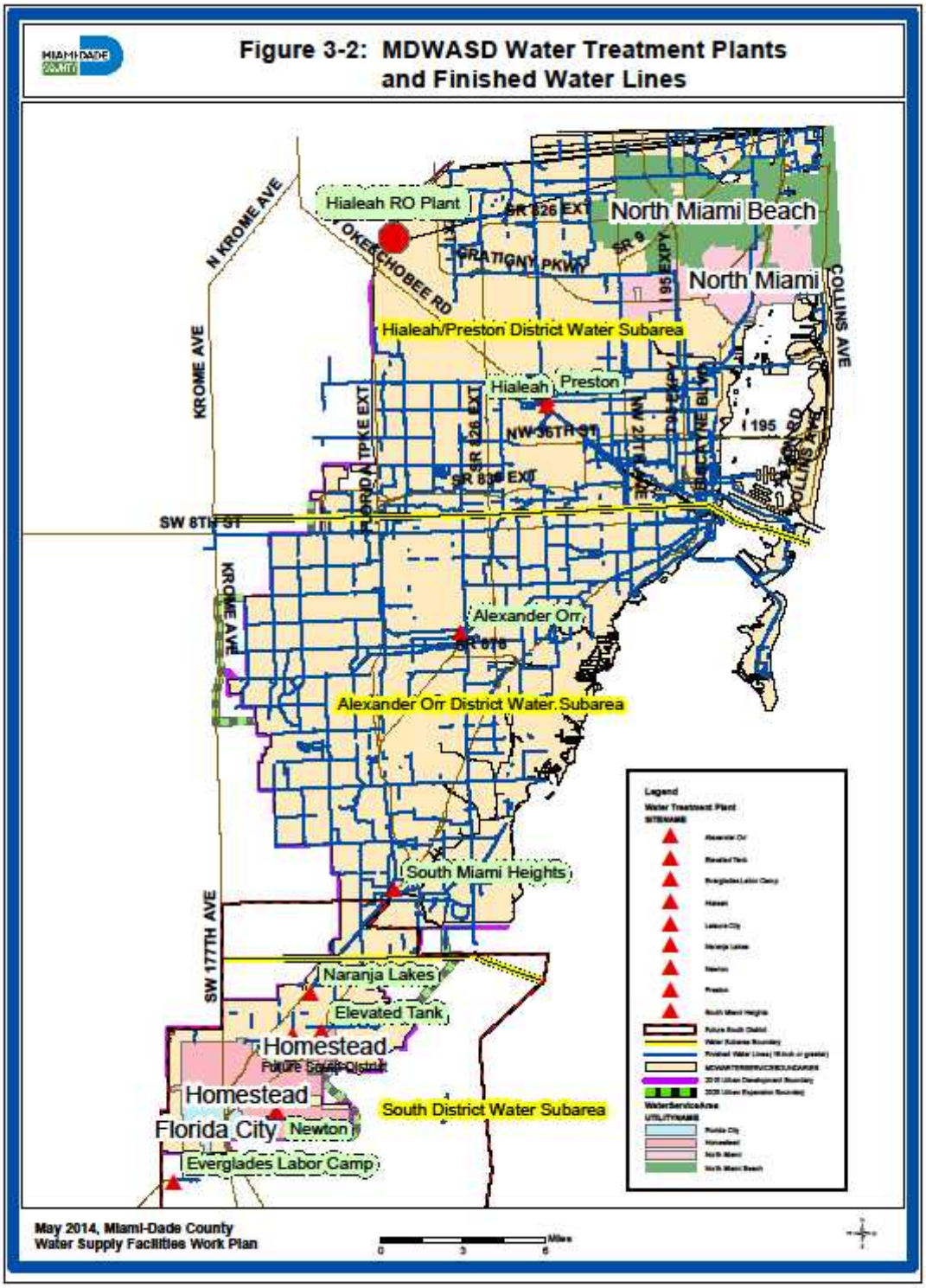


Figure 3-2: MDWASD Water Treatment Plants and Finished Water Lines
Hialeah RO Plant
North Miami Beach
North Miami
Hialeah/Preston District Water Subarea
Hialeah
Preston
Alexander Orr
Alexander Orr District Water Subarea
South Miami Heights
Naranja Lakes
Elevated Tank
Homestead
Homestead
Florida City
Newton
Everglades Labor Camp
South District Water Subarea
N KROME AVE
KROME AVE
SW 8TH ST
SW 177TH AVE
OKEECHOBEE RD
GRATIGNY PKWY
SR 826 EXT
SR 9
I 95 EXPY
COLLINS AVE
SR 826 EXT
NW 36TH ST
NW 27TH AVE
BISCAYNE BLVD
I 195
SR 836 EXT
SR 874
Legend
Water Treatment Plant
SITENAME
Alexander Orr
Hialeah
Hialeah Preston
Hialeah Preston
Naranja Lakes
Newton
Preston
South Miami Heights
Future South District
Water Subarea Boundary
Finished Water Lines (16 inch or greater)
MDWATERSERVICEBOUNDARIES
2015 Urban Development Boundary
2025 Urban Expansion Boundary
WaterServiceArea
UTILITYNAME
Florida City
Homestead
North Miami
North Miami Beach
May 2014, Miami-Dade County
Water Supply Facilities Work Plan
0
3
6
Miles

Table 3-1 Biscayne Aquifer Wellfield Data

Wellfield	Wellfield	
	Installed Design Capacity	**Number of Wells**
Hialeah-Preston		
Hialeah	12.54	3
John E. Preston	53.28	7
Miami Springs	79.30	20
Northwest[a]	149.35	15
Subtotal	**294.47**	**45**
Medley Wellfield (emergency only)[b]	48.96	4
Alexander Orr		
Alexander Orr	74.40	10
Snapper Creek	40.00	4
Southwest	161.20	17
West	32.40	3
Subtotal	**308.00**	**34**
Existing South Dade		
Elevated Tank[c]	4.32	2
Everglades Labor[d]	5.04	3
Leisure City[c]	4.18	4
Naranja[c]	1.15	1
Newton[d]	4.32	2
Subtotal	**19.01**	**12**
***Proposed South Miami Heights*[e]**		
Former Plant	*4*	*1*
Roberta Hunter Park	*6*	*4*
Subtotal	***10.00***	***5***
Existing MDWASD System Total(Biscayne Aquifer)	**670.44**	**95**
Proposed MDWASD System Total(Biscayne Aquifer)	**680.44**	**100**

(a) Northwest wellfield capacity at 150 mgd when pumps operate at low speed.
(b) Wells in this wellfield had been abandoned. They have been restored with the purpose of using them only during an emergency
(c) Abandoned when SMH WTP on line by 2018
(d) Stand-by when SMH WTP on line by 2018
(e) SMH WTP on line by 2018
Source: MDWASDWater Use Permit No. Re-issue 13-00017-W, July 16, 2012, and proposed modification, June 2014

3.1.2.1 Hialeah Wellfield

The three active wells located in the Hialeah Wellfield were constructed in 1936. Each well is 14 inches in diameter, 115 feet deep and have casing depths of 80 feet. The total wellfield capacity is 12.54 mgd or 8,700 gpm (2,900 gpm for each well).

3.1.2.2 John E. Preston Wellfield

The seven active wells located in the John E. Preston Wellfield were constructed in 1966 and 1972. Each well is 42 inches in diameter, 107 feet deep and have casing depths of 66. The capacity of wells No. 1 through No. 6 is 5,000 gallons per minute (gpm) each and the capacity of well No. 7 is 7,000 gpm. The total wellfield capacity is 53.28 mgd.

3.1.2.3 Miami-Springs Wellfield

The twenty active wells located in the Miami Springs Wellfield were constructed between 1924 and 1954. These wells are 14 inches and 30 inches in diameter, 80 to 90 feet deep and have casing depths of 80 feet. The total wellfield capacity is 79.30 mgd or 55,070 gpm (ranging between or 2,500 and 5,000 gpm for each well).

3.1.2.4 Northwest Wellfield

The Northwest Wellfield has fifteen active wells that were constructed in 1980. The wells are 40 inches and 48 inches diameter and 80 to 100 feet deep, with casing depths ranging from 46 to 57 feet. These wells have two-speed motors. The total nominal capacity of the wells at the low speed flow rate is 149.35 mgd. The capacity of each well, except well No. 10, is 10 mgd at the low speed flow rate. Well 10 have a low speed capacity of 9.35 mgd. The total nominal capacity for the wells at the high speed flow is 220.94 mgd.

3.1.2.5 Medley Wellfield

The Medley Wellfield had previously been abandoned. However, four wells were recently rehabilitated for emergency use only. The wells are 42 inches and 48 inches in diameter and 100 to 115 feet deep, with casing depths ranging from 42 to 48 feet. The total wellfield capacity is 48.96 mgd or 34,000gpm

3.1.2.6 Hialeah RO Wellfield

The Hialeah RO wellfield has six (6) active wells that were contructed in 2012. The wells are 16 and 17-inches in diameter, with depth ranging from 1,452 to 1,490 and casing depths ranging from 1,060 to 1,080 feet. The capacity of each well is 2 mgd. The total capacity of the wellfield is 12 mgd.

3.1.3 Alexander Orr, Jr. Subarea Wellfields

The Alexander Orr, Jr. WTP is supplied by four water supply wellfields as shown on Figure 3-1. The total designed installed capacity from the four wellfields in the Alexander Orr, Jr. service area is approximately 308 mgd. There are Floridan Aquifer wells at two of the wellfields. Appendix A provides detailed information about well construction and capacities, of the Alexander Orr, Jr. area wellfields.

3.1.3 Alexander Orr, Jr. Subarea Wellfields

The Alexander Orr, Jr. WTP is supplied by four water supply wellfields as shown on Figure 3-1. The total designed installed capacity from the four wellfields in the Alexander Orr, Jr. service area is approximately 308 mgd. There are Floridan aquifer wells at two of the wellfields. Appendix A provides detailed information about well construction and capacities, of the Alexander Orr, Jr. area wellfields.

3.1.3.1 Alexander Orr, Jr. Wellfield

The ten active wells located in the Alexander Orr, Jr. Wellfield were constructed between 1949 and 1964. These wells are 16 inches and 42 inches in diameter, 100 feet deep and have casing depths ranging from 40 to 50 feet. The capacity of the wellfield is 74.4 mgd (ranging between 4,170 and 7,500 gpm for each well). In the past, there was some concern about Saltwater intrusion in this wellfield. As a result improvements were implemented to a control structure on the C-2 Canal, which reduced the saltwater intrusion.

3.1.3.2 Snapper Creek Wellfield

The four active wells located in the Snapper Creek Wellfield were constructed in 1976. These wells are 24 inches in diameter, 108 feet deep and have casing depths of 50 feet. The total wellfield capacity is 40.0 mgd or 27,760 gpm (6,940 gpm for each well).

3.1.3.3 Southwest Wellfield

The seventeen (17) active wells located in the Southwest Wellfield were constructed between 1953 and 1997. These wells are 20 inches to 48 inches in diameter, 88 to 104 feet deep and have casing depths ranging from 33 to 54 feet. The total wellfield capacity is 161.20 mgd (ranging between or 4,900 and 7,500 gpm for each well).

3.1.3.4 West Wellfield

The West Wellfield has three wells that were constructed in 1994. The wells are 24 inches in diameter and 70 feet deep, with casing depths of 40 feet. The total wellfield capacity is 32.4 mgd or 7,500 gpm per well. This wellfield is limited by the SFWMD to 15 mgd on either an average or maximum daily basis. Well No. 29 pumpage is limited to 5 mgd; Well No. 30 is limited to 10 mgd; and Well No. 31 is to be used as a standby well only to be used with prior written approval from the SFWMD.

3.1.3.5 Floridan Aquifer ASR

Three Upper Floridan Aquifer wells are located in the West Wellfield (WWF) and two are located in the Southwest Wellfield (SWWF). These wells were constructed in 1996 and 1997 and are 30 inches in diameter. The total depth of these wells is between 1,200 feet and 1,300 feet with casing depths between 835 feet and 850 feet. The total capacity of the West Wellfield wells is 15.00 mgd or 3,500 gpm per well. The total capacity of the Southwest Wellfield wells is 10.08 mgd or 3,500 gpm per well.

MDWASD is cycle testing the ASR wells at the SWWF and WWF. MDWASD anticipates using these wells for storage of fresh Biscayne Aquifer water in the

Floridan Aquifer during the wet season for extraction and use in the dry season. As part of the Underground Injection Control (UIC) ASR permit requirements, MDWASD installed an ultra-violet (UV) light disinfection system at both the SWWF and the WWF to provide treatment of Biscayne Aquifer water prior to injecting in the Floridan Aquifer.

MDWASD operates the ASR system according to Department of Environmental Protection UIC permits. Injected water from the Biscayne Aquifer is from the Biscayne Aquifer water allocation in the 20-year Water Use Permit 13-00017-W for the WWF and the SWWF.

3.1.4 South Dade Subarea Wellfields

The five (5) South Dade WTPs are supplied by five individual water supply wellfields as shown on Figure 3-1. The total designed installed capacity from the five wellfields for the South Dade subarea is 19.01 mgd. Appendix A provides detailed information about well construction and capacities, of the existing South Dade area wellfields. The proposed South Miami Heights Wellfield will serve the South Dade area by December 31, 2018.

3.1.4.1 Elevated Tank Wellfield

The two (2) active wells located in the Elevated Tank Wellfield were constructed in 1982 and 1996. These wells are 12 inches and 16 inches in diameter, 45 to 50 feet deep and have casing depths of 35 and 40 feet. The wellfield's capacity totals 4.32 mgd or 1,500 gpm for each well.

3.1.4.2 Everglades Wellfield

The three (3) active wells located in the Everglades Wellfield were constructed from 2000 to 2001. These wells are 18 inches in diameter, between 50 and 55 feet deep and have casing depths of 40 and 45 feet. The wellfield's capacity totals 5.04 mgd, ranging between or 700 and 1,500 gpm for each well, excluding the three abandoned wells.

3.1.4.3 Leisure City Wellfield

The four (4) active wells located in the Leisure City Wellfield were constructed between 1953 and 1971. These wells are 6 inches and 12 inches in diameter, approximately 30 to 40 feet deep and have casing depths ranging from 25 to 35 feet. The wellfield's capacity totals 4.18 mgd, ranging between or 450 and 1,500 gpm for each well.

3.1.4.4 Naranja Wellfield

The only active well located in the Naranja Wellfield was constructed in 1975. This well is 12 inches in diameter, 40 feet deep and has a casing depth of 35 feet. The wellfield's capacity totals 1.15 mgd or 800 gpm.

3.1.4.5 Newton Wellfield

The two (2) active wells located in the Newton Wellfield were constructed in 2000 and 2001. These wells are 18 inches in diameter, approximately 65 feet deep and have casing depths ranging from 50 to 53 feet. The wellfield's capacity totals 4.32 mgd or 1,500 gpm for each well, excluding two abandoned wells.

3.1.4.6 Future South Miami Heights Wellfield

MDWASD has commenced the design of the South Miami Heights WTP and associated wellfields in the South Dade subarea. Of the five existing WTPs and wellfields in the South Dade subarea, only Everglades and Newton WTPs and wellfields will remain on a stand-by basis The three anticipated wellfields and their capacities are: Former Plant Wellfield, 4.0 mgd; Roberta Hunter Park Wellfield,6 mgd; and South Miami Heights 24 mgd. The future SMHs WTP will have a capacity to produce 20 mgd (max day) finish water using a combination of Floridan and Biscayne raw water.

3.1.5 Other Water Supply Wellfields

3.1.5.1 City of North Miami

The City of North Miami Winson Water Treatment Plant (WTP) is currently supplied exclusively from the Biscayne Aquifer. There are presently eight (8) 12-inch diameter wells, ranging in depths from 56 to 124 feet. They were drilled and put into service in 1962. Two wells are located at the WTP site, and another three pairs are located at three different public parks in the vicinity of the WTP. These wellfields provide water supply to a portion of unincorporated Miami-Dade County in addition to within the City of North Miami municipal boundary.

3.1.5.2 City of North Miami Beach

The City of North Miami Beach Norwood Water Treatment Plant is supplied by sixteen (16) Biscayne aquifer and four (4) Floridan aquifer wells. These wellfields provide water supply to a portion of unincorporated and incorporated Miami-Dade County in addition to within the City of North Miami Beach municipal boundary.

3.1.5.3 City of Homestead

The City of Homestead is currently supplied by six Biscayne Aquifer withdrawal wells, with a current capacity of 15.22 MGD. There are two 16-inch, two 18-inch, and two 20-inch diameter wells, all 60 feet in depth. The Wittkop Park wellfield, in the northwest part of the service area, has 4 wells, and the Harris wellfield, located just east of Federal Highway, US-1, has two wells. These wellfields provide water supply to a portion of unincorporated Miami-Dade County in addition to within the City of Homestead municipal boundary.

3.1.5.4 Florida City

The City of Florida City water treatment plant is supplied by four (4) production wells located on a site adjacent to the treatment plant. There are two (2) 12-inch and two (2) 10- inch diameter wells. All four wells withdraw water from the Biscayne Aquifer.

3.2 Water Treatment/Storage Facilities

The MDWASD water system is based on the three large treatment plants, the Hialeah RO plant and the smaller treatment plants in the extremely southern portion of Miami-Dade County, as shown on **Figure 3-2**.

3.2.1 Hialeah-Preston Water Treatment Plants (WTPs)

The Hialeah and John E. Preston WTPs are located at 200 W. 2nd Avenue and 1100 W. 2nd Avenue, respectively. The adjacent facilities in Hialeah share interconnected source water and finished water storage capacity. These two plants serve the Hialeah-Preston subarea, generally, the service area that lies north of Flagler Street. The two plants have similar treatment processes, which are described separately below.

3.2.1.1 Hialeah Water Treatment Plant

The Hialeah WTP was originally designed in 1924 with a total capacity of 10 mgd. By 1935, the plant's capacity totaled 40 mgd. In 1946, capacity was increased to 60 mgd. Air strippers with a capacity of 84 mgd were added to the treatment process in 1991 to remove volatile organics from the finished water. A 3.2 MG storage reservoir for both the Hialeah and John E. Preston WTPs was also added in 1991. There are plans to rerate and upgrade the Hialeah WTP to a capacity of 70 mgd, if necessary.

The source water for Hialeah WTP is from the Hialeah-Miami Springs Wellfields, supplemented by the Northwest Wellfield. The Hialeah WTP has a current rated capacity of 60 mgd. The treatment process includes lime softening with sodium silicate activated by chlorine, recarbonation, chlorination, ammoniation, fluoridation, filtration, and air stripping. The plant site is relatively small, and is surrounded by residential areas.

3.2.1.2 John E. Preston Water Treatment Plant

The John E. Preston WTP was originally designed as a 60 mgd plant in 1968 and upgraded to 110 mgd in 1980. The plant was rerated to a total capacity of 130 mgd in 1984. The plant reached its present capacity of 165 mgd with another addition in 1988. In 1991, the plant was modified with an air stripping capacity of 185 mgd to remove VOCs. In 2005, the plant process modifications to provide enhanced softening for reduction of color and total organic carbon came on line.

The main source of water for the Preston WTP is from the Northwest Wellfield. The current rated capacity is 165 mgd with a treatment process similar to that of the Hialeah WTP. This includes lime softening with ferric and other coagulant and chemicals added prior to lime for enhanced softening, recarbonation, chlorination, ammoniation, fluoridation, filtration, and air stripping. The Preston plant is also cited in a residential area of Hialeah.

3.2.1.3 Hialeah Reverse Osmosis (RO) Water Treatment Plant

On December 27, 2007, the Miami-Dade County and the City of Hialeah entered into a Joint Participation Agreement (JPA) to design, construct, and operate a water

treatment plant. The JPA specified that the County and the City would be equal partners in funding the project.

The Hialeah RO WTP was released for operation by the Florida Department of Health in November 2013. The Plant is located at 4250 W. 114th Terrace in the City of Hialeah, and is approved to operate at a capacity of 7.5 MGD. An additional capacity of 2.5 MGD is scheduled to be completed by December 31, 2015. The main source of water for the Hialeah RO WTP is the Floridan Aquifer. The Hialeah RO plant is currently in operation serving 50% of its water capacity to the City of Hialeah and 50% to unincorporated areas within the MDWASD's service area.

3.2.2 Alexander Orr, Jr. Water Treatment Plant

The Alexander Orr, Jr. WTP is located at 6800 S.W. 87th Avenue in Miami. The original design capacity was 40 mgd in 1954. This plant has undergone several expansions during the past 50 years. The raw water pumping capacity was increased by 32 mgd to 262 mgd in 1995 with an additional source from the West Wellfield. Additional reservoir and high pressure service capacities were also added to bring the total plant design capacity to 256 mgd. The plant rated capacity is 217.74 mgd.

The Alexander Orr, Jr. WTP receives its source water from the Alexander Orr, Jr. Wellfield, Snapper Creek Wellfield, Southwest Wellfield, and the West Wellfield. The Alexander Orr, Jr. WTP treatment process is similar to the other two major plants utilizing lime softening with activated sodium silicate added prior to lime as a coagulant aid, recarbonation, fluoridation, chlorination, ammoniation, and filtration. Unlike the Hialeah and Preston WTPs, this plant does not utilize enhanced softening or air stripping towers. The Alexander Orr, Jr. WTP can also receive groundwater from five Upper Floridan Aquifer wells located in the West Wellfield and the Southwest Wellfield. Finished water is distributed to a service area generally delineated as south of Flagler Street.

3.2.3 South Dade Water Treatment Plants

In 1985, MDWASD purchased an existing private utility known as the Rex Utility District Water System. Today, this system is referred to as the South Dade Water System. At the time of purchase, the system consisted of six plants and associated wellfields. Since the time of purchase, the Redavo WTP has been taken out of service.

The South Dade Water System is currently made up of five small WTPs that draw groundwater from the 12 wells located at the plant sites. The five small plants serving the South Dade Service Area include Elevated Tank, Everglades Labor Camp, Leisure City, Naranja, and Newton WTPs. These plants are located in the Southern portion of the County as shown on Figure 3-2. The plants utilize in-line disinfection with free chlorine and stabilization with the addition of polyphosphate. The 2013 annual average daily flow (ADF) for the plants is 7.29 mgd. This system serves a population of approximately 46,673 in the Leisure City, Everglades Labor Camp, and Naranja areas excluding the cities of Homestead and Florida City, which provide their own water service. These small treatment plant capacities are limited by the pumping capabilities at each plant.

MDWASD commenced the design of a new South Miami Heights (SMH) WTP in the South Dade subarea. Of the five existing plants in the South Dade subarea, only Everglades and Newton WTPs will remain on a stand-by basis when the SMH WTP comes into service by the end of 2018. The total annual average daily demand for the future South Miami Heights WTP will be approximately 18 mgd.

3.2.4 Other Water Treatment Plants

3.2.4.1 City of North Miami

The City of North Miami Norman H. Winson Water Treatment Plant is located at Sunkist Grove, 12098 NW 11th Avenue, and was commissioned in 1962. The Winsom WTP utilizes lime-softening and is capable of supplying 9.3 MGD of water to consumers, but on average the plant produces 7.7 MGD, or 63 percent of the total demand which is approximately 12.2 MGD. The Winson WTP provides treated water to a portion of unincorporated Miami-Dade County in addition to within the City of North Miami municipal boundary and the Village of Biscayne Park.

3.2.4.2 City of North Miami Beach

The City of North Miami Beach supplies water through the City owned and operated Norwood-Oeffler Water Treatment Plant, located on the northeast corner of NW 191st Street and NW 9th Avenue. The Norwood-Oeffler Water Treatment plant, originally constructed in 1953, is a lime-softening water treatment facility. The plant was upgraded in 2007 to include membrane treatment of raw water from the Biscayne and Floridan Aquifers. The treatment now consists of blending of lime softening and nanofiltration of Biscayne Aquifer water with reverse osmosis for the Floridan Aquifer water. The treated water is stored in two above-ground storage tanks at the Norwood-Oeffler WTP prior to being pumped into the City's water transmission and distribution system. The Water Treatment Plant is currently permitted by the South Florida Water Management District (SFWMD) to withdraw 26.31 mgd of raw water from the Biscayne Aquifer and 12.07 mgd from the Floridan Aquifer The treatment plant has an approved capacity of 32 mgd. The WTP provides treated water to a portion of unincorporated and incorporated Miami-Dade County in addition to within the City of North Miami Beach municipal boundary.

3.2.4.3 City of Homestead

The City is supplied by two water treatment plants. The Wittkop Park plant is located at 505 NW 9th Street, and is supplied by four Biscayne Aquifer wells with a capacity of 11.2 MGD. The Harris Field water treatment plant is located at 1084 NE 8th Street. This plant is supplied by two Biscayne Aquifer wells, and has a capacity of 5.7 MGD. Both water treatment facilities use chlorination for disinfection, and have a combined capacity of 16.92 MGD. The Wittkop Park and Harris Field WTPs provide treated water to a portion of unincorporated Miami-Dade County in addition to within the City of Homestead municipal boundary.

3.2.4.4 Florida City

The City of Florida City supplies water through a chlorination water treatment facility, with a capacity of 4 MGD. The water treatment plant is located at 461 NW 6

Avenue, adjacent to the City's Loren Roberts Park.

3.2.5 Finished Water Storage

3.2.5.1 Hialeah Preston Subarea

The finished water storage facilities for the Hialeah-Preston subarea consist of both "in-plant" and remote storage facilities. The storage facilities are summarized in **Table 3-3**.

Table 3-3 Hialeah-Preston Finished Water Storage Facilities

Location	Description	Capacity (MG)
Hialeah WTP	Reservoir – Ground Storage	3.0
Hialeah WTP	Clearwell	1.7
John E. Preston WTP	Ground Storage Tank No. 1	9.0
John E. Preston WTP	Ground Storage Tank No. 2	14.0
John E. Preston WTP	Clearwell	1.1
N.W. 20th Street	Ground Storage Tank	7.5
N.W. 36th Street	Ground Storage Tank	5.0
N.W. 67th Street	Ground Storage Tank	8.2
N.W. 30th Street	Ground Storage Tank	2.5
N.E. 79th Street	Elevated Storage Tank	2.0
Carol City	Ground Storage Tank	2.0
	Total Storage	**56.0**

Source: MDWASD Water Facilities Master Plan, 2003 and MDWASD

3.2.5.2 Alexander Orr, Jr. Subarea

The water storage facilities of the Alexander Orr, Jr. subarea consist of a 39-MG ground storage tank located at the WTP site and a 1.6-MG plant clear well.

3.2.5.3 South Dade Subarea

The South Dade Subarea currently has no significant storage facilities. Therefore, the system is very vulnerable to emergency situations.

MDWASD commenced design of the new South Miami Heights WTP in the South Dade subarea. As part of the projects, a 5 MG reservoir was constructed in 2012, which is currently operating as a re-pump station, until the WTP is completed.

3.2.5.4 Other Water Suppliers

The City of North Miami has two storage tanks that hold treated water prior to being pumped into the distribution system. The total combined storage capacity of the two tanks is 2.25 million gallons, or 17 percent of the current average daily demand. These storage tanks provide storage of treated water to service a portion of unincorporated Miami-Dade County in addition to within the City of North Miami municipal boundary.

The City of North Miami Beach stores the treated water in two above-ground storage tanks at the Norwood-Oeffler WTP prior to being pumped into the City's water transmission and distribution system. The storage capacities of the tanks are 4.2 and 2.0 million gallons. The City also uses a 2-million gallon remote tank bringing the total storage capacity in the City's water-supply system to 8.2 million gallons. These storage tanks provide storage of treated water to service a portion of unincorporated Miami-Dade County in addition to within the City of North Miami Beach municipal boundary.

The City of Homestead stores the finished water in three elevated storage tanks. After treatment, water from five of the six wells is stored in an elevated water storage tank at either Harris Field (0.5 MG), Wittkop Park (0.5 MG), or the Homestead Motorsports Complex (1.0 MG). Water from Well No. 5 at Harris Field is pumped directly into the system after treatment on an as-needed basis. The combined capacity of the storage tanks is 2 MG. These storage tanks provide storage of treated water to service a portion of unincorporated Miami-Dade County in addition to within the City of Homestead municipal boundary.

Florida City has one storage tank that holds treated water prior to distribution within its service area. The tank's storage capacity is 0.5 million gallons.

3.3 Water Distribution Facilities

The MDWASD water distribution system is currently supplied by three regional treatment plants ,five (5) smaller treatment plants located in the southern portion of Miami- Dade County, and the Hialeah RO WTP. The distribution systems serving these treatment plants are comprised of loops and are interconnected, as shown on Figure 3-2.

3.3.1 Hialeah-Preston Subarea

Finished water from the Hialeah and John E. Preston WTPs is pumped through a system of dedicated low-pressure pipelines to remote storage tanks and pumping facilities. This system provides water service to the southeastern part of the Hialeah-Preston subarea. The low pressure system starts at the Hialeah WTP with a 42-inch diameter main heading due east along N.W. 62nd Street, and 36-inch and 42-inch diameter mains running southeast along Okeechobee Road then parallel to the Miami River. The main on N.W. 62nd Street connects to the N.W. 67th Street pumping station, which pumps the water to the south through a 30-inch diameter main running along N.W. 10th Ave. The 30-inch diameter main continues south and connects into the N.W. 36th Street pumping station. This main continues further south and connects into the golf ground pump station.

The 36-inch and 42-inch diameter mains combine into a 54-inch diameter main at N.W. 42nd Avenue. They split again into a 36-inch and a 42-inch diameter main at N.W. 32nd Avenue. These mains connect to the 30th Avenue pump station. The 30th Avenue pump station feeds two 36-inch diameter mains that connect to the 20th Street pumping station to complete the loop. The pipe loop is made predominantly of concrete and cast iron pipes that were installed in the early 1930s. Some segments of this loop

having been in service for more than 60 years. Replacement of these pipes are scheduled in the MDWASD maintenance program.

The remaining part of this subarea is served by a high pressure system. Water is pumped into the system by five high service in-plant pumps with a total capacity of 34.1 mgd at 167 feet total dynamic head (TDH). The high pressure system delivers water service to Hialeah, Miami Springs, and a high pressure main connected to the City of Miami. The northern section of the subarea is supplied by one major piping loop. The loop begins at the plant with a 72-inch diameter main heading north along West 2nd Avenue, next it turns west at West 20th Street, and then it turns North along West 4th Avenue to NW 191st Street. At this location, it turns east until it reaches N.E. 18th Avenue. It then turns south and connects into a 54-inch diameter main that connects to the N.W. 67th Street pumping station.

The southwestern portion of the subarea is supplied by a 36-inch diameter main that connects to the 54-inch diameter main heading out of the John E. Preston WTP at West 25th Street. The main heads west on N.W. 74th Street then turns south on N.W. 107th Avenue. It eventually interconnects with the Alexander Orr, Jr. subarea piping network on S.W. 56th Street around S.W. 117th Avenue.

3.3.2 Alexander Orr, Jr. Subarea

The distribution system of the Alexander Orr, Jr. subarea is comprised of two major piping loops. The first major loop traverses the south and west portion of the subarea. The loop starts at the WTP with a 60-inch diameter main heading west on S.W. 64th Street and a 48-inch diameter main that runs south along S.W. 87th Avenue (Galloway Road) until S.W. 216th Street. The 48-inch diameter main then heads west along S.W. 216th Street to a tee connection at S.W. 127th Avenue. One branch of the tee runs north on S.W. 127th Avenue to S.W. 184th Street and then turns west to 137th Avenue. The 48-inch diameter main travels north on 137th Avenue to S.W. 152nd Street, where it connects into a 24-inch diameter main running east-west on 152nd Street and a 36-inch diameter main that continues north on 137th Avenue to S.W. 120th Street. There, the 36-inch diameter main turns west, then runs north along Hammocks Boulevard to S.W. 88th Street where it reduces to a 24-inch diameter main that runs north along S.W. 152nd Avenue to 72nd Street. The 24-inch diameter main then runs east-west on S.W. 72nd Street. At S.W. 147th Avenue, it connects with a 36-inch diameter main that runs north to S.W. 56th Street (Miller Road), where it connects with a 42-inch diameter main that runs east on Miller Road. This 42-inch diameter main enlarges to a 48-inch diameter main that eventually connects to the 60-inch diameter main at the intersection of Miller Road and S.W. 117th Avenue to complete the loop. A 36-inch diameter main branches off of the 60-inch diameter main at the intersection of Miller Road and S.W. 117th Avenue. This 36-inch diameter main heads north along S.W. 117th Avenue and eventually interconnects the Alexander Orr, Jr. and the Hialeah-Preston subareas.

The second loop starts at the WTP with two 48-inch diameter mains. One main runs north on S.W. 87th Avenue (Galloway Avenue) to S.W. 40th Street (Bird Road) and then turns east. The main continues east along Bird Road, reduces to a 42-inch

diameter main at N.W. 57th Avenue, then connects through a 30-inch diameter pipe connection with the second 48-inch diameter main at Bird Road and S.W. 37th Avenue (Douglas Road). The second 48-inch diameter main travels along Highway 874 to S.W. 56th Street, where it turns east then northeast between S.W. 67th Avenue and S.W. 62nd Avenue to S.W. 48th Street. The main runs east on S.W. 48th Street then northeast through several changes in direction, where it connects to the other 48-inch diameter main at Bird Road and S.W. 37th Avenue. The main then travels north along South Dixie Highway and eventually interconnects with the Hialeah-Preston Service Area piping network through a 36-inch diameter pipe that runs along S.W. 2nd Avenue.

3.3.3 South Dade Subarea

The South Dade water distribution system consists of small water mains with diameters ranging from 16 inches to 4 inches. The distribution system is centered around each individual WTP. Each has its own sets of water main loops within the distinct service areas. The Leisure City, Elevated Tank, and Naranja WTPs, however, are so well interconnected that they can be generally considered as one distribution area. More than 63 percent of the South Dade subarea is served by these three plants. The distribution system of these three plants form one major loop that is bounded on the north by S.W. 248th Street, on the south by S.W. 304th Street, on the east by S.W. 117th Avenue, and on the west by S.W. 172nd Avenue.

The Everglades Labor Camp WTP serves a small area that is bounded on the north by S.W. 376th Street, on the south by S.W. 384th Street, on the east by S.W. 192nd Avenue, and on the west by S.W. 194th Path. This distribution system consists of one 12-inch-diameter loop around the service area interconnected with several 8-inch diameter distribution mains. The Everglades Labor Camp and the Newton WTP distribution system are interconnected via an 8-inch diameter main that runs east along S.W. 376th Street then heads north on S.W. 187th Avenue, where it connects with a 12-inch diameter main at S.W. 360th Street. The 8-inch diameter main continues north on S.W. 187th Avenue until S.W. 352nd Street, where it connects into a small distribution loop that terminates with a 16-inch diameter stub-out.

The Newton WTP distribution system consists of a single 12-inch diameter water main that runs east and west on S.W. 336th Street. The eastbound main then branches north and south along S.W. 152nd Avenue. The southbound branch then turns east on S.W. 344th Street and ultimately connects to the FP&L Turkey Point generating plant. The northbound branch continues along S.W. 152nd Avenue, where it connects to the Leisure City WTP distribution system at S.W. 304th Street. A 6-inch diameter main running south from SW 288th Street on S.W. 137th Avenue then east on S.W. 328th Street connects to an 8-inch diameter main that runs south on 117th Street. This 8-inch diameter main connects to the 12-inch diameter main to FP&L Turkey Point generating plant. This main ultimately completes the interconnection of the Newton WTP with the Leisure City, Elevated Tank, and Naranja WTPs' distribution areas.

The westbound branch of the 12-inch diameter main turns south on S.W. 162nd Avenue then heads south and west on Palm Drive. The main then continues south on S.W. 167th Avenue then west on S.W. 360th Street until it connects to the Everglades Labor Camp WTP 8-inch diameter main that runs north on SW 187th Avenue.

The South Dade distribution system is interconnected with the Alexander Orr distribution system in the vicinity of SW 127th Avenue. MDWASD commenced the construction and operation of the South Miami Heights WTP and associated wellfields in the South Dade Subarea. Of the five exsisting WTPs and wellfields in the South Dade area, only Everglades and Newton WTPs and wellfields will remain on a stand-by service when the SMHWTP comes on line by 2018. MDWASD will be constructing a water main to interconnect with the Everglades and Newton Systems to provide water and meet additional future demands. The SMHWTP will connect to the existing distribution systems of the South Dade Plants to be taken out of service by 2018, when SMHWTP comes online.

3.3.4 Other Water Distribution Facilities

3.3.4.1 City of North Miami

The City of North Miami's distribution system consists of two 16-inch and one 12-inch diameter ductile iron pipes. The two 16-inch diameter pipes mostly service the areas east of the WTP. One of the 16-inch pipes eventually connects to a 20-inch pipe and then to two 12-inch pipes. The 20-inch and one of the two 12-inch pipes connects o a large 30-inch transmission main at different points. This 30-inch pipe serves as the main transmission line on the far-east side of the City. The other 16-inch main reduces to a 12-inch pipe. The 12-inch transmission main leaving the WTP travels west, then south, and expands into the distribution system. The City also maintains seven supply interconnections with MDWASD and a emergency interconnections with the City of North Miami Beach and City of Opa-Locka. This distribution system provides treated water to service a portion of unincorporated Miami-Dade County in addition to within the City of North Miami municipal boundary.

3.3.4.2 City of North Miami Beach

The City of North Miami Beach distribution system provides treated water to service a portion of unincorporated Miami-Dade County in addition to within the City of

North Miami Beach municipal boundary from the WTP.

The City has eleven high service pumps that deliver finished water to the distribution system at approximately 60 to 80 psi and have a combined capacity of 45 mgd with largest one pump out of service. The City's distribution system is fed by 18-inch, 24-inch, and 36-inch diameter transmission mains.

3.3.4.3 City of Homestead

The City's water distribution system is comprised of an interconnected string of mains ranging from 2-inches to 24-inches in diameter, mostly of ductile iron pipe. The water from the storage tanks flows into the mains, with a pressure of 45 to 60 psi.

On July 9, 2010, the City of Homestead entered into a 20-year water wholesale agreement with MDWASD to purchase up to 3 MGD of water to meet the demands of its retail customers. The interconnection between the City and MDWASD occurs at SW 137th Avenue and SW 288th Street. ?????

3.3.4.4 Florida City

Florida City's water distribution system is comprised of an interconnected string of mains ranging from 2-inches to 16-inches in diameter, mostly of ductile iron pipe. The City's distribution system provides service within its municipal boundaries..

3.4 Summary

As shown within this section, the MDWASD water supply and treatment systems have sufficient installed capacity to produce more potable water than is currently required. The supply capacity and treatment capacity are 724.44 MGD and 517.19 MGD respectively. **Table 3-4** summarizes this information. **Table 3-5** summarizes other suppliers facilities capacities.

The capacities of these water supply and treatment systems have been coordinated with future demands and allocations. Sections 4 and 5 of this Work Plan address future demands and required water supply facilities.

Table 3-4 MDWASD Facilities Capacities

Facility	Installed Capacity (mgd)
Hialeah-Preston Water Treatment Plants	60 + 165 = **225**
Hialeah-Preston Well fields	
Preston	53.28
Hialeah	12.54
Miami Springs	79.30
Northwest[a]	149.35
Medley Wellfield [b]	48.96
Hialeah RO Water Treatment Plant	**10**
Hialeah RO Wellfield (Floridan Aquifer)	
Existing Hialeah RO	12.00
Future Hialeah RO (2015)	8.00
Alexander Orr Water Treatment Plant	**248**
Alexander Orr Well fields	
Orr Plant	74.40
Snapper Creek	40.00
Southwest	161.20
West	32.40
South Dade Water Treatment Plants	**14.19**
South Dade Wellfields	
Elevated Tank	4.32
Everglades Labor Camp	5.04
Leisure City	4.18
Naranja	1.15
Newton	4.32
Future South Miami Heights Water Treatment Plant (2018)	***20.00***
Future South Miami Heights Wellfields	
Former Plant (Biscayne Aquifer)	*4.00*
Roberta Hunter Park (Biscayne Aquifer)	*6.00*
South Miami Heights RO (Floridan Aquifer)	*24.00*
Existing WASD Wellfield Total	**682.44**
Existing WASD Water Treatment Plant Total	**497.19**
Future WASD Wellfield Total	**724.44**
Future WASD Water Treatment Plant Total	**517.19**

(a) Northwest wellfield capacity at 150 mgd when pumps operate at low speed.

(b) Wells in this wellfield had been abandoned. They have been restored with the purpose of using them only during an emergency.
Source: MDWASD Water Use PermitNo. 13-00017-W, revised July 2012 , and requested revision June 2014.

Table 3-5 Other Suppliers' Facilities Capacities

Facility	Installed Capacity (mgd)
City of North Miami	
Norman H. Winsom Water Treatment Plant	9.30
City's well fields (8 wells)	**14.96**
City of North Miami Beach	
Norwood-Oeffler Water Treatment Plant	**32.00**
City of North Miami Beach Wellfields	
Biscayne Aquifer Wellfields	27.90
Floridan Aquifer Wellfields	12.07
City of North Miami Beach Wellfields	**39.97**
City of Homestead	
Wittkop Park – Harris Field Water Treatment	11.2+5.7=**16.9**
City of Homestead Wellfields	
Wittkop Park	11.23
Harris Field	5.76
City of Homestead Wellfields	**16.99**
Florida City	
Florida City Water Treatment Plant	***4***
Florida City Wellfields	***4***

Source: City of North Miami Beach SFWMD Water Use Permit Staff Report (August 2007) and Water Use Permit No. Re-issue 13-00060-W, Draft Water Supply Facilities Work Plan (City of North Miami, March 2008), Information provided by discussions with staff for the City of Homestead and Florida City

Section 4
Population and Water Demand Projections

This section presents historical and projected population projections from Year 2010 through Year 2033 for MDWASD's service area. Population data were obtained from the Miami-Dade County Department of Regulatory and Economic Resources (RER), Planning Division, based on the 2010 Census and derived from Transportation Analysis Zone (TAZ), On June 20, 2014, MDWASD submitted an application for modification and extension of the 20-year Water Use Permit (WUP) No. 13-00017-W. The modification and extension to the current WUP are a result of revised population projections based on the 2010 Census and the continued successful implementation of the County's Water Conservation Plan. The requested modification to the WUP included new population data, revised water demand projections and alternative water supply projects to support water demands through the year 2033. MDWASD's Reuse projects were listed but they are not required to address water supply. The revised population projections for the year 2030 are consistent or slightly lower, than the projections in the District's Lower East Coast Water Supply Update, dated October 2013.

4.1 Historical Population

Historical populations served by the MDWASD system are shown in **Table 4-1** in one year increments from Year 2010 to Year 2013. The population in MDWASD's service area grew approximately 2.8% between Year 2010 and year 2013. Table 4-1 also provides a summary of historical population within Miami-Dade County. The MDWASD system served approximately 86% of the County total population in 2013.

Table 4-1 Historical Population Served by MDWASD

YEAR	TOTAL MDWASD	TOTAL COUNTY
2010	2,160,138	2,496,435
2011	2,181,073	2,523,474
2012	2,202,008	2,550,513
2013	2,222,944	2,577,552

Source: Miami-Dade County RER, Planning Division, 2010 Census TAZ data

4.2 Population Projections

Population projections for MDWASD's service area in five year increments from Year 2014 to 2033 are shown in **Table 4-2**. Overall, the population served by MDWASD is expected to increase approximately 17.78% from Year 2014 to Year 2033.

Table 4-2 Population Projections to be Served by MDWASD

Year	Total MDWASD	Total* County
2014	2,243,879	2,604,590
2015	2,266,092	2,631,629
2020	2,370,769	2,766,823
2025	2,475,446	2,902,018
2030	2,580,123	3,037,212
2031	2,601,058	3,064,251
2032	2,621,994	3,091,289
2033	2,642,929	3,118,328

Sources: *Miami-Dade County RER, Planning Division, 2010 Census TAZ Data

Upon completion of the New South Miami Heights Water Treatment Plant by 2018, the South-Dade subservice area boundary will be shifted northward such that portions of the population currently within the Alexander-Orr subarea will be within the South Dade subarea. **Figure 4-1** illustrates the boundary shift. The boundary shift will cause a general redistribution of service between the Alexander-Orr and South Dade areas, but will not have other effects on the population expected to be served by MDWASD. In 2033, MDWASD will serve potable water to approximately 85% of the total County population.

4.3 Historical Water Use

Historic water use figures reflect water provided by the Hialeah-Preston, Alexander-Orr, Everglades, Leisure City, Newton, Elevated Tank, and Naranja WTPs and associated wellfields. These water use figures provide the basis for forecasting future water demands for MDWASD's service area.

Table 4-3, referred to as Table F in previous submittals to the SFWMD**,** provides the historical raw and finished water use for Year 2004 through Year 2013. Information shown in Table 4-3 includes per capital annual average and maximum month water use.

4.4 Water Demand Projections

The water demand projections presented herein are based on an initial system-wide finished water daily per capita use rate of 137.2 gallons per capita per day (gpcd). The per capita use was determined by taking a 3-year average from 2011 to 2013. The initial per capita rate has declined due to water use reductions resulting from water conservation and reuse irrigation water projects. **Table 4-4,** referred to as Table G in previous submittals to the SFWMD**,** provides the projected raw and finished water use for Year 2014 through Year 2033. Table 4-4 also provides projected raw water pumpage from the Biscayne and Floridan Aquifers in five-year increments to indicate how the sources of water will be used to meet future demand.

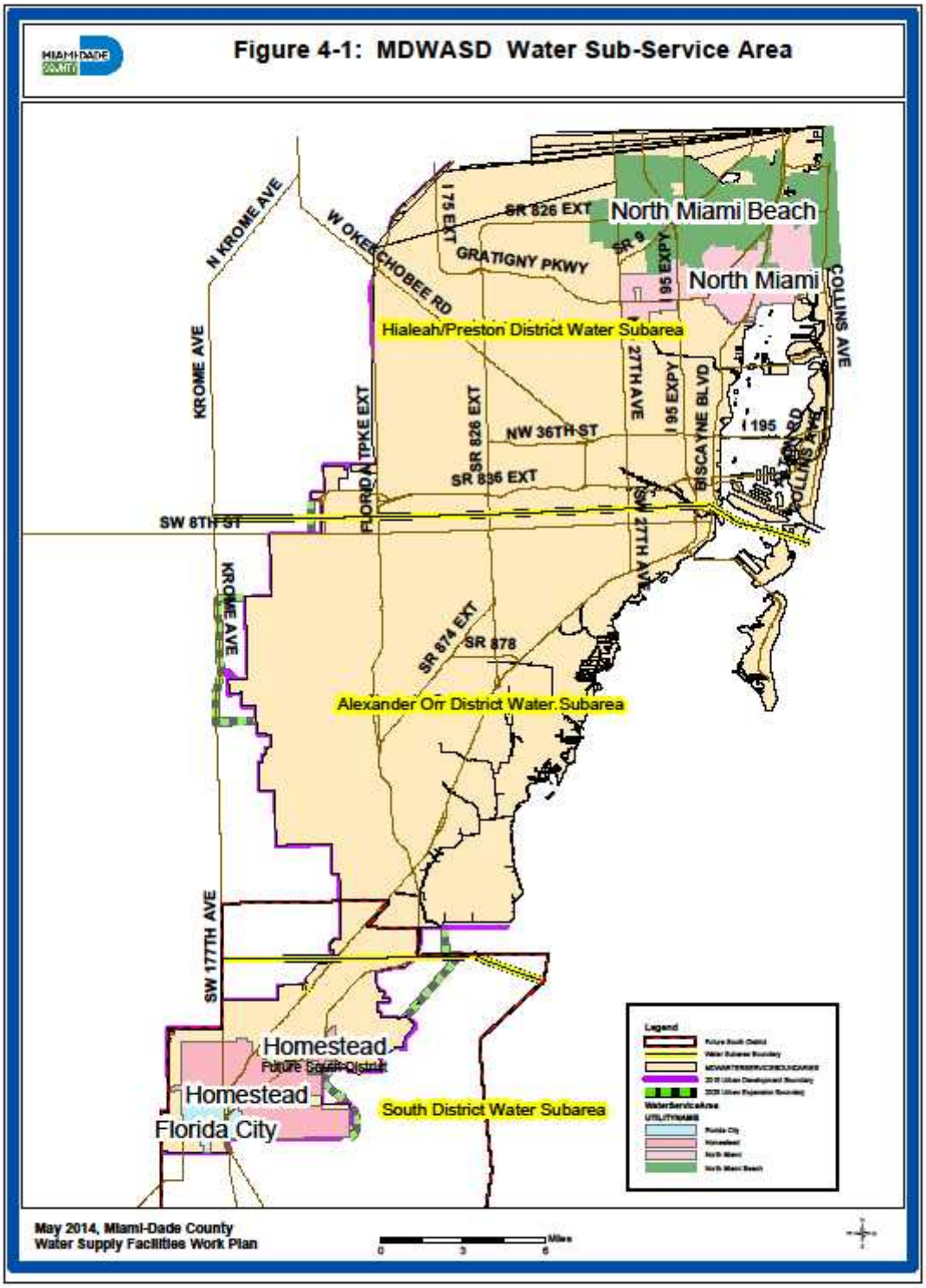


Figure 4-1: MDWASD Water Sub-Service Area
North Miami Beach
North Miami
Hialeah/Preston District Water Subarea
Alexander Orr District Water Subarea
South District Water Subarea
Homestead
Future South District
Homestead
Florida City
N KROME AVE
W OKEECHOBEE RD
I 75 EXT
SR 826 EXT
GRATIGNY PKWY
SR 9
I 95 EXPY
COLLINS AVE
KROME AVE
FLORIDA TPKE EXT
SR 826 EXT
NW 36TH ST
27TH AVE
I 95 EXPY
BISCAYNE BLVD
I 195
SR 836 EXT
SW 8TH ST
SW 27TH AVE
KROME AVE
SR 874 EXT
SR 878
SW 177TH AVE
Legend
May 2014, Miami-Dade County
Water Supply Facilities Work Plan
Miles
0
3
6

TABLE 4-3 (September 2014) Miami-Dade Water and Sewer Department (MDWASD) Past Water Use (2004-20013)

1	2	3	4	5	6	7	8	9	10	11	12	13
FINISHED WATER HISTORICAL USE							**RAW WATER HISTORICAL USE [(a)]**					**Ratio Finished:Raw (Total Annual Use)**
Year	**Population Served ***	**Per Capita Usage (gpcd)**	**Total Annual Use (MG)**	**Average Month Use (MG)**	**Max Month Use (MG)**	**Ratio Max : Aver. Month**	**Per Capita Usage (gpcd)**	**Total Annual Use (MG)**	**Average Month Use (MG)**	**Max Month Use (MG)**	**Ratio Max : Aver. Month**	
TOTAL MDWASD WATER SYSTEM SERVICE AREA **												
2004	2,090,099	162.5	124,301	10,358	10,861.1	1.05	165.6	126,685	10,557	11,063	1.05	1.019
2005	2,101,772	161.8	124,098	10,342	10,734.8	1.04	165.1	126,670	10,556	11,031	1.04	1.021
2006	2,113,445	161.6	124,677	10,390	10,988.6	1.06	164.7	127,019	10,585	11,170	1.06	1.019
2007	2,125,118	150.3	116,602	9,717	10,485.4	1.08	151.6	117,585	9,799	10,648	1.09	1.008
2008	2,136,791	138.1	108,029	9,002	9,583.0	1.06	149.4	116,820	9,735	10,508	1.08	1.081
2009	2,148,464	142.3	111,627	9,302	9,662.7	1.04	151.2	118,575	9,881	10,550	1.07	1.062
2010	2,160,138	141.4	111,453	9,288	9,700.0	1.04	151.0	119,056	9,921	10,346	1.04	1.068
2011	2,181,073	140.2	111,585	9,299	9,597.6	1.03	149.2	118,768	9,897	10,273	1.04	1.064
2012	2,202,008	134.8	108,626	9,052	9,693.9	1.07	142.5	114,807	9,567	10,223	1.07	1.057
2013	2,222,944	136.5	110,388	9,199	9,483.7	1.03	144.6	117,623	9,802	10,252	1.05	1.066
3-year Average (2011-2013)	-	137.2	-	-	-	1.04	145.4	-	-	-	1.05	1.062

* Source of Population Information: Miami-Dade County RER Planning Division. Historic Population 2001 to 2009 adjusted (downward) based on, and 2010 to 2013 represents the 2010 TAZ population projections by the MDC RER Planning Division, based on 2010 Census.

** For 2004 - 2007 from MDWASD Raw & Finished Water Historical Data, For 2008 - 2013 from MDWASD reports to SFWMD of Water Treatment Plant Influent & Effluent Flow Meter Flows

(a) Raw-to-finished water ratio is 1.06. MDWASD is improving its raw water metering/accounting system.

TABLE 4-4 (September 2014)
MDWASD PROJECTED FINISHED WATER DEMANDS

1	2	3	4	5	6	7	8	9
Year	PROJECTIONS (2013) FOR MDWASD SERVICE AREA							
	Pop.[a]	Finished Water Use (gpcd)	AADD Finished Water Use[b] (MGD)	Water Conservation[c] (MGD) Credit	Reuse/ Reclaimed Water [d] (MGD) Credit	Adjusted Finished Water Demand[e] (MGD)	Adjusted Finished Water Use (gpcd)	CITY OF HOMESTEAD Finished Water Demand (MGD)
System-Wide								
2014	2,243,879	137.2	307.19	1.36	0.00	306.43	136.56	2.50
2015	2,266,092	137.2	310.84	2.04	0.00	308.80	136.27	3.00
2020	2,370,769	137.2	325.20	5.44	0.00	319.76	134.88	3.00
2025	2,475,446	137.2	339.56	8.84	0.00	330.72	133.60	3.00
2030	2,580,123	137.2	353.92	9.55	0.00	344.37	133.47	3.00
2031	2,601,058	137.2	356.79	9.55	0.00	347.24	133.50	3.00
2032	2,621,994	137.2	359.66	9.55	0.00	350.11	133.53	3.00
2033	2,642,929	137.2	362.53	9.55	0.00	352.98	133.56	3.00

Footnotes

(a) Population Served represents the TAZ population projections based on 2010 Census Data provided by the MDC RER Planning Division.

(b) Annual Average Daily Demand (AADD) Finished Water Projections between 2014 and 2033 assume 137.2 gpcd (a decrease from 145.4 gpcd total water system demand prior to application of credits (e.g. conservation).

(c) MDWASD has implemented a 20-year water use efficiency plan and is experiencing reductions in per capita water consumption. Water Conservation projections were revised based on the 2010 Annual Water Conservation Plan Conserve Florida Report (March 2011). Real losses in non-revenue water (e.g. unaccounted-for-water) are assumed to remain at less than 10%. The conservation amounts experienced through 2010 (6.54 MGD) were deducted from the 20-year conservation amount in the Conserve Florida Report and the remaining conservation amounts were distributed for the balance of the 20-year period (2011-2027).

(d) Not Used

(e) Adjusted after taking credit in finished water demand projections for reductions in finished water use associated with water conservation.

4.5 Water Conservation and Reuse

4.5.1 MDWASD

4.5.1.1 Water Conservation

The per capita usages contained in Table 4-4 are adjusted taking into consideration MDWASD water conservation. MDWASD is implementing a 20-year water conservation plan and is implementing ways for reducing non-revenue water. The *MDWASD 20-year Water Use Efficiency Goal Based Plan* (Plan) was approved by the SFWMD in May 2007. The Water Conservation projections included in Table 4-4 were revised based on the *2010 Annual Water Conservation Plan Conserve Florida Report* (March 2011). Included in the 20-year Plan is the Water Conservation Best Management Practices (BMP) Planning Spreadsheet prepared by Malcolm Pirnie, Inc. in 2007. Table 5: Countywide BMP Implementation Schedule, Costs, and Savings Projections from *The Water UseEfficiency 5-Year Plan* is located in Appendix E. Currently, MDWASD is implementing all BMPs included in the Plan. Additionally, Miami-Dade County has enacted water use efficiency-legislation including permanent landscape irrigation restrictions, landscape ordinances requiring Florida Friendly landscaping in new construction, in right of ways, and the installation of high efficiency plumbing fixtures in new construction (see Appendix D) and some reuse within the three wastewater treatment plant sites or in their vicinities.

Water conservation activities are funded annually through the operations and maintenance budget and are therefore not included in capital budgets. Values contained within Table 4-4 reflect projections as of June 2014.

Water conservation projections do not reflect water demand reductions presented by the "Unaccounted Water Loss Reduction Plan (February 2007)" prepared by Malcolm Pirnie, Inc. The potential additional reduction in water demands as a result of real non-revenue water loss is estimated at 14.25 mgd over the next ten years.

Water Conservation is in accordance with SFWMD Water Use Permit No. Re-Issue 13-00017-W, Limiting Condition Nos. 45 and 49 and Exhibit 27.

For more information about our Water Conservation Program please go to http://www.miamidade.gov/conservation/home.asp

4.5.1.2 Water Reuse

On June 28, 2013, MDWASD submitted to the Secretary of FDEP the Ocean Outfall Legislation Compliance Plan. A total of 117.5 mgd of reuse will be implemented, out of that 27.6 mgd of reclaimed water will be used to recharge the Floridan Aquifer. The Floridan Aquifer recharge will be applied on equal capacities at the existing Central and South District Wastewater Treatment Plants, and a proposed West District Wastewater Treatment

Plant (9.2 mgd each), and up to 90 mgd of reuse water will be provided to FPL for Turkey Points Units 5, 6 and 7 cooling. The reuse projects and completion dates are listed in Exhibit 14 of the County's 20-year water use permit modification request, included in Appendix F.

The County's projected finished water demands are now markedly lower than anticipated when the first 20-year water use permit application was submitted. This demand reduction has eliminated the anticipated supply shortages which were the basis for an ambitious schedule of several costly alternative water supply projects. As such, reuse to address water supply is no longer required or needed

As noted in Exhibit 14 in Appendix F, MDWASD is currently implementing a total of 16.49 mgd of reuse at each of the Wastewater Treatment Plants. The reclaimed water is used for industrial and public and non-public irrigation.

4.5.2 Other Water Suppliers

4.5.2.1 City of North Miami

The City of North Miami has developed a water conservation plan to help reduce the demand for potable water and lower its consumption on a per capita basis. The conservation plan includes the adoption of Florida friendly landscaping methods, the implementation of a water conservation public education program, the implementation of a leak detection program, water loss prevention programs, and the exploration of the utilization of reuse water for irrigation and non-potable water uses. The City is also implementing an incentives program, and encouraging the development of "green buildings". They will also continue to enforce the wellfield protection ordinance which limits the allowable land uses within the wellfield's cone of influence, and will continue to monitor water quality levels in the drainage basins to maintain a minimum level of service standards. Currently, all the City's wastewater is treated by MDWASD, and therefore the City does not have a water reuse and reclamation program.

4.5.2.2 City of North Miami Beach

The City of North Miami Beach has seen major successes in ways of alerting and educating residents on water and environmental conservation. In 2005, the City created a Water Conservation Program that applies conservation methods to reduce water demand and to lower the per capita consumption of potable water. The program includes collective efforts to increase the overall water use efficiency and to limit water losses to 10 percent or less. They have also initiated a water conservation educational and outreach program. Another aspect of the conservation program is the continuation and installation of water efficient landscape, plumbing and irrigation ordinances, as well as a water shortage and emergency ordinance. In addition, they have begun the use of alternative water sources, mainly the Floridan aquifer. Other methods for water conservation taking

place at the City include meter replacements and a showerhead exchange program.

Also, the North Miami Beach Water fund established the Foundation for Water and Environmental Education which is a not-for-profit organization with funds and programs managed by its own directors and established to maintain and aid water resource management in the City of North Miami Beach community.

4.5.2.3 City of Homestead

The City of Homestead has developed a water conservation plan to reduce potable water consumption. The plan includes a permanent irrigation ordinance which establishes irrigation restrictions prohibiting landscape irrigation between 9:00 AM and 4:00 PM., a Florida Friendly ordinance that promotes use of drought landscape methods, a high efficiency plumbing fixture ordinance that establishes water conservation standards for plumbing fixtures installed in new construction, and a leak detection program. In addition, the City has a residential and commercial meter replacement program where all meters will be replaced within the next 5 years. The City will adopt the Automatic Meter Reading technology which allows the reading of water consumption remotely which will allow accurate and true monthly readings. Also, the City is implementing a rain sensor device ordinance that requires all irrigation systems equipped with automatic controls to have a rain sensor switch which turns off the system when more than 0.5 inches of rain has fallen. A water conservation education program is also taking place.

The City has also implemented a reclaimed water system, where most of the wastewater from the City's sewer service area is treated at the City's Wastewater Treatment Plant (WWTP). The wastewater from the City's WWTP receives treatment (including ultra-violet radiation to eliminate the possible formation of disinfection by- products) and is reused to recharge the surficial aquifer. 100% of the City's WWTP output [approximately 6 MGD (4.730 MGD, average)] is currently recharging the aquifer via two primary and four secondary rapid infiltration trenches.

4.5.2.4 Florida City

Florida City is currently implementing a water main replacement program, where they are abandoning all existing 2, 4 and 6-inch diameter mains and installing new 8 and 12-inch diameter DIP water mains. They are also following the SFWMD restrictions for irrigation water use that are currently in place.

4.6 Summary

In summary, the historically based MDWASD service area projected water demands as adjusted for water conservation and reuse are presented in **Table 4-5** as "adjusted" finished water demand and per capita water use. The resulting

anticipated finished water demands in 5-year increments to 2030, and from 2031-2033 is as follows:

Table 4-5 MDWASD Service Area Incremental Water Demands

Year	Population[a]	Adjusted Finished Water (mgd)	Adjusted Per Capita Water Use (gpcd)
System-Wide			
2014	2,243,879	306.43	136.56
2015	2,266,092	308.80	137.27
2020	2,370,769	319.76	134.88
2025	2,475,446	330.72	133.60
2030	2,580,123	344.37	133.47
2031	2,601,058	347.24	133.50
2032	2,621,994	350.11	133.53
2033	2,642,929	352.98	133.56

Section 5
Planned Water Supply Facilities

This section details the water supply facilities that are planned in order to meet MDWASD's water demands through 2033. The County's projected finished water demands are now markedly lower than anticipated when the first 20-year water use permit application was submitted to South Florida Water Management District (SFWMD) in 2007. This demand reduction has eliminated the anticipated supply shortages which were the basis for an ambitious schedule of several costly alternative water supply projects which are no longer required or needed. Reuse projects to address water supply have been eliminated. The decrease in water demands is a result a successful implementation of the County's Water Conservation Plan and new population projections based on the 2010 Census. For ease of reference, the project start and finish dates have been provided below the title of the following subsections. The Capital Improvement Elements Tables 8 and 12 located in Appendix B.

5.1 Alternative Water Supply Projects

The following proposed alternative water supply (AWS) projects are to meet MDWASD's water demands through 2033, which encompasses the proposed modification to the 20-year Consumptive Use Permit period. AWS projects have been identified to meet water demands in the MDWASD service area and are presented in **Table 5-1, Table 5-2** and **Figure 5-1**.

The plan described herein demonstrates that the proposed projects, by their location, volume of water produced, and timing of implementation, will be sufficient to meet the water demand increases. These projects will undergo further refinement and development over the next few months. The flow (Q MGD) shown in parentheses below represents the corresponding amount of finished water annual average daily demand (AADD) provided by the projects in terms of million gallons per day (MGD). These AWS projects and AADD assume that all current wholesalers will remain on the MDWASD system through 2033.

Table 5-1: MDWASD) Proposed Alternative Water Supply Projects From Alternative Water Supply Project D3evelopment Submitted to SFWMD June 2014

Year	Annual Average Finished Water Quantity in MGD and Source		
2013	7.5	Hialeah Floridan Aquifer RO WTP-Phase 1-a, 10 MGD & 6 Floridan Aquifer supply wells	AWS
2015	2.5	Hialeah Floridan Aquifer RO WTP-Phase 1-b, 4 Floridan Aquifer supply wells	AWS
2018	12.45	South Miami Heights WTP Phase 1(RO portion)	AWS
2030	5.0	South Miami Heights WTP Phase 2(RO portion)	AWS
Total	27.45		

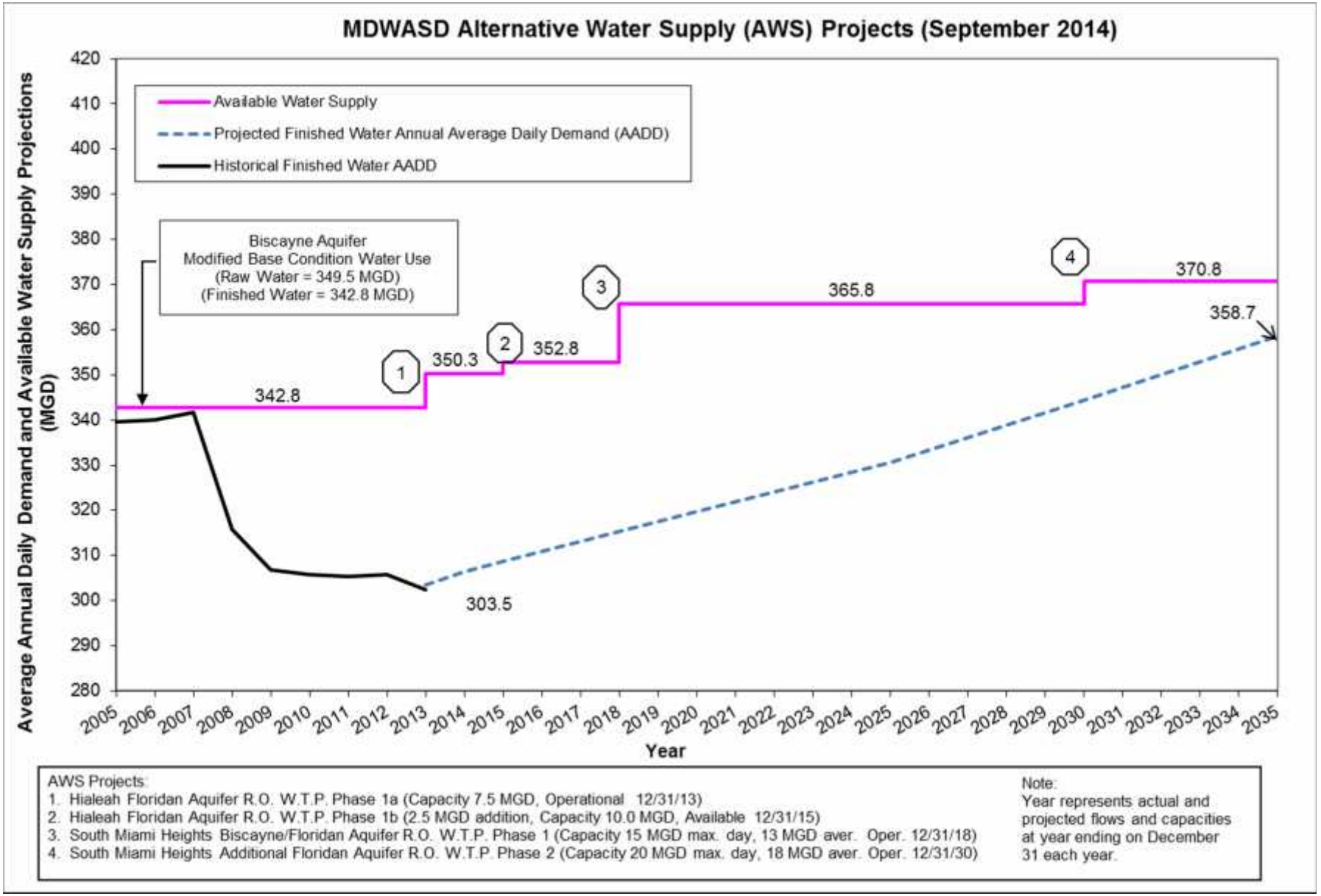
TABLE 5-2 (September 2014)

MDWASD FINISHED WATER DEMAND BY SOURCE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	PROJECTIONS (2013) FOR MDWASD SERVICE AREA								ADJUSTED FINISHED WATER AADD (MGD)								
									Biscayne Aquifer					Floridan Aquifer			
Year	Population[a]	Finished Water Use (gpcd)	AADD Finished Water Use[b] (MGD)	Water Conservation[c] (MGD) Credit	Reuse/ Reclaimed Water[d] (MGD) Credit	Adjusted Finished Water Demand[e] (MGD)	Adjusted Finished Water Use (gpcd)	CITY OF HOMESTEAD Finished Water Demand (MGD)	South Dade[g]		South Miami Heights (SMH) Membrane Softening WTP[i,m]	Hialeah-Preston/ Alexander-Orr Lime Softening (j)	Total Biscayne Aquifer (f)	Hialeah RO WTP[l]	South Miami Heights (SMH) RO WTP[m]	Total Floridan Aquifer	Total All Sources
									Elevated Tank/ Leisure City/ Naranja	Everglades Labor Camp/ Newton[h]							
System-Wide																	
2014	2,243,879	137.2	307.79	1.36	0.00	306.43	136.56	2.50	4.30	4.08	0.00	293.05	301.43	7.50	0.00	7.50	308.93
2015	2,266,092	137.2	310.84	2.04	0.00	308.80	136.27	3.00	4.30	4.10	0.00	293.40	301.80	10.00	0.00	10.00	311.80
2020	2,370,769	137.2	325.20	5.44	0.00	319.76	134.88	3.00	0.00	*4.10*	2.55	297.76	300.31	10.00	12.45	22.45	322.76
2025	2,475,446	137.2	339.56	8.84	0.00	330.72	133.60	3.00	0.00	*4.10*	2.55	308.72	311.27	10.00	12.45	22.45	333.72
2030	2,580,123	137.2	353.92	9.55	0.00	344.37	133.47	3.00	0.00	*4.10*	2.55	322.37	324.92	10.00	12.45	22.45	347.37
2031	2,601,058	137.2	356.79	9.55	0.00	347.24	133.50	3.00	0.00	*4.10*	2.55	320.24	322.79	10.00	17.45	27.45	350.24
2032	2,621,994	137.2	359.66	9.55	0.00	350.11	133.53	3.00	0.00	*4.10*	2.55	323.11	325.66	10.00	17.45	27.45	353.11
2033	2,642,929	137.2	362.53	9.55	0.00	352.98	133.56	3.00	0.00	*4.10*	2.55	325.98	328.53	10.00	17.45	27.45	355.98

See Footnotes on page 5-3

Footnotes
(a) Population Served represents most recent represents the 2010TAZ population projections by the MDC Planning Department.
(b) Annual Average Daily Demand (AADD) Finished Water Projections between 2014 and 2035 assume 137.2 gpcd (a decrease from 145.4 gpcd) total water system demand prior to application of credits (e.g. conservation).
(c) WASD has implemented a 20-year water use efficiency plan and is experiencing reductions in per capita water consumption. Water Conservation projections were revised based on the 2010 Annual Water Conservation Plan Conserve Florida Report (March 2011). Real losses in non-revenue water (e.g. unaccounted-for-water) are assumed to remain at less than 10%. The conservation amounts experienced through 2010 (6.54 MGD) were deducted from the 20-year conservation amount in the Conserve Florida Report and the remaining conservation amounts were distributed for the balance of the 20-year period (2011-2027).
(d) Not Used (TBD).
(e) Adjusted after taking credit in finished water demand projections for reductions in finished water use associated with water conservation.
(f) The Modified Base condition raw water use (349.5 mgd) represents values agreed to by SFWMD and MDWASD and demonstrated by modeling to not cause a net increase in water from the regional canal system. Biscayne Aquifer base condition raw water use allocation of 349.5 mgd (South Dade at 7.1 mgd, North and South at 342.4 mgd) equates to 342.8 mgd of finished water annual average daily demand (AADD).
(g) South Dade (Raw : Finished) Ratio = 1.0 : 1.0
(h) Becomes *stand-by* once SMH WTP starts up. This *stand-by* capacity is not used in the total raw and finished water amounts.
(i) Assumes withdrawals from Elevated Tank, Leisure City, Naranja, Caribbean Park, Former Plant, and Roberta Hunter Park are consolidated. Biscayne Aquifer supplied Membrane Softening (Raw : Finished) Ratio = 1.17 : 1.00 (85% Recovery).
(j) Hialeah-Preston / Alexander-Orr (Raw : Finished) Ratio = 1.060 : 1.00 (Lime Softening)
(k) The values are based on initial cycle testing of the ASR well facilities and the projected seasonal operations of the ASR well facilities at full design capacities with the storing of Biscayne aquifer water during the wet weather months of June through October and the recovery of the stored Biscayne aquifer water during the dry weather months of December through April, assuming an ultimate storage loss of 1.31%.
(l) Floridan Aquifer supplied RO WTP (Raw : Finished) Ratio = 1.333 : 1.00 (75% recovery)
(m) At an ultimate 20 mgd plant operating capacity, the raw water withdrawal would be 3.00 MGD from the Biscayne and 23.27 MGD from the Floridan in accordance with the Wellfield Operation Plan. In order to maintain operational flexibility and protect the nanofiltration membranes (Biscayne supply), MDWASD is requesting that the WTP be allowed to operate with up to a constant supply of 3.0 MGD from the Biscayne aquifer and the rest, to meet demand, be provided from the Floridan aquifer. The full use of the small Biscayne aquifer allocation at SMH supplemented by Floridan aquifer water will allow a blended finished water product that is expected to be lower in sodium and chloride, which will be beneficial to customers on low sodium diets, and more will require less chemical addition for product water stabilization.
(n) An additional 0.82 MGD of Raw Water AADD has been included in year 2033 for Hialeah-Preston / Alexander Orr Lime Softening to maintain the total Biscayne aquifer Modified Base condition raw water use at 349.5 mgd and to provide needed operational flexibility in withdrawals of Floridan aquifer water.


MDWASD Alternative Water Supply (AWS) Projects (September 2014)
Average Annual Daily Demand and Available Water Supply Projections (MGD)
Available Water Supply
Projected Finished Water Annual Average Daily Demand (AADD)
Historical Finished Water AADD
Biscayne Aquifer
Modified Base Condition Water Use
(Raw Water = 349.5 MGD)
(Finished Water = 342.8 MGD)
342.8
350.3
352.8
365.8
370.8
358.7
303.5
1
2
3
4
Year
AWS Projects:
1. Hialeah Floridan Aquifer R.O. W.T.P. Phase 1a (Capacity 7.5 MGD, Operational 12/31/13)
2. Hialeah Floridan Aquifer R.O. W.T.P. Phase 1b (2.5 MGD addition, Capacity 10.0 MGD, Available 12/31/15)
3. South Miami Heights Biscayne/Floridan Aquifer R.O. W.T.P. Phase 1 (Capacity 15 MGD max. day, 13 MGD aver. Oper. 12/31/18)
4. South Miami Heights Additional Floridan Aquifer R.O. W.T.P. Phase 2 (Capacity 20 MGD max. day, 18 MGD aver. Oper. 12/31/30)
Note:
Year represents actual and projected flows and capacities at year ending on December 31 each year.

5.1.1 Hialeah Floridan Aquifer R.O. W.T.P (10 MGD)

A new upper Floridan Aquifer Reverse Osmosis (RO) water treatment plant was constructed in 2013, and is located at 4250 W. 114th Terrace in the City of Hialeah. The WTP was constructed pursuant to a Joint Participation Agreement between the City of Hialeah and the County which was approved by the Board of County Commissioners on July 24, 2007 and called for the design, construction, and operation of a water treatment plant constructed in the annexation area and supplied by the brackish Floridan aquifer to produce initially 10 mgd with the capacity to expand to 17.5 mgd.

Approval from the Florida Department of Health to produce and distribute water was received in November 2013. The WTP utilizes the Floridan Aquifer as the alternative water supply using the RO treatment to remove the salt. The initial operational phase of the Plant is 7.5 mgd, increasing to 10 mgd by the end of 2015 when construction of additional wells is expected to be completed.

5.1.1.1 Hialeah Floridan Aquifer R.O. W.T.P. Phase 1-a (7.5 MGD) Completed 2013

Phase 1-a of the RO WTP included a 10 mgd plant and an initial six (6) Floridan Aquifer supply wells. The phase 1-a cost was about $95 million.

5.1.1.2 Hialeah Floridan Aquifer R.O. W.T.P. Phase 1-b (2.5 MGD)

Start 2014
Finish 2015

Phase 1-b of the RO WTP will consist of the construction of four (4) Floridan Aquifer supply wells for a maximum treatment capacity of 10 mgd. The Phase 1-b cost is estimated at approximately $5 million.

5.1.2 South Miami Heights W.T.P. and Wellfield (20 MGD)- 17.45MGD Floridan Aquifer RO and 2.55 MGD Biscayne Aquifer

Start 2014
Finish 2018

Design of the South Miami Heights Water Treatment Plant (WTP) and Wellfield commenced in 2014. The WTP will be located at 18800 SW 208 Street in Miami. The RO WTP and associated facilities will have a capacity to produce 20 mgd (max day) finished water using a combination of 17.45 mgd from the Floridan Aquifer and 2.55 mgd from the Biscayne Aquifer. Phase 1 will have a maximum capacity of 15 mgd to be operational by December 31, 2018, and Phase 2 will a maximum capacity of 20 mgd, operational by December 31, 2030. A total of five (5) Biscayne Aquifer wells and seven (7) Floridan Aquifer wells are planned to be constructed.

Upon completion of the WTP, the Elevated Tank, Leisure City, and Naranja WTPs will be abandoned and their associated allocations will be transferred to the SMHs

WTP. Everglades Labor Camp and Newton WTPs will remain on stand-by service.

5.2 Miscellaneous Projects

5.2.1 Water Conservation/Non-Revenue Potential Water Loss Reduction Program (Up to 19.62 MGD)

Start 2006
Finish 2027

These projects serve to reduce the demand for water through demand management. They include, but are not limited to, various water conservation projects currently being implemented by MDWASD. The County's Water Use Efficiency Five-Year Plan was approved by the Board and has been expanded to cover the next 20 years with a projected reduction in demand of 19.62 MGD over that time period. Examples of ongoing conservation projects include the bathroom and kitchen retrofits program, Miami-Dade green lodging and restaurant program, , rebates for high efficiency toilets, and landscaping irrigation evaluations for residential, commercial and governmental uses. Similarly, the Non-Revenue Real Water Loss Program identified potential reductions in water demand of as much as 14.25 MGD by 2030 through demand management activities.

5.3 20-Year Work Plan and Capital Improvement Plan

As mentioned in the previous sections, the latest lower population projections based on the 2010 Census results and historically lower per capita daily finish water use have reduced the projected finish water demands which have eliminated the need for other alternative water supply projects by several years. The Alternative Water Supply projects to address water demands through 2033 include the Hialeah RO and South Miami

The projects for the 20-Year Work Plan have been included in the County's Capital Improvement Element. A copy of Table 12 from the County's Capital Improvement Element is contained within Appendix D and summarized in **Table 5-3** for the next 5 years (2014 – 2018).

Table 5-3 MDWASD Water/Alternative Water Supply CIE Projects

Project Name	Expenditure[(a)]						Six Year Totals
	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018	
Water Facilities							
South Miami Heights W.T.P. & Wellfield	17.11	46.20	43.80	5.19	0.00	0.00	112.31
Hialeah Floridan Aquifer R.O.W.T.P. Phase 1 (10.0 mgd)	23.79	4.77	1.34	7.383	4.08	6.09	47.48

Source: MDWASD Adopted FY 2012-2013 budget, (a) Millions of Dollars

5.4 Other Water Suppliers Future Plans

5.4.1 City of North Miami

The City of North Miami's plans for a two-phase expansion of the Winson WTP have been put on hold. The plans entailed a Phase I, to be concluded by 2010, to add an additional 8.5 MGD capacity from a Reverse Osmosis (RO) system. Phase II to add additional membrane treatment to the RO facility, which would create an additional 4.0 MGD capacity. The proposed improvements would total an increase of 12.5 MGD to the capacity of the WTP.

The City also identified that the Floridan aquifer would be the only water resource alternative for the increase in demand. Therefore, the City planned to construct an additional ten Floridan wells to supply the RO Facility. The City planned to add a raw water transmission main from the wells to the WTP.

On hold is also the third expansion plan for the addition of a 5 MG storage tank, to be located on a vacant parcel owned by the City's new Biscayne Landing development. The City may decide to forgo with the construction of the tank and utilize the parcel for another smaller RO Treatment facility or a reuse facility.

These water supply system improvements planned by the City of North Miami will provide water supply for those portions of unincorporated Miami-Dade County which are currently served by the City of North Miami.

The City is currently designing upgrades to the existing facility to maximize its efficiencies.

5.4.2 City of North Miami Beach

The City of North Miami Beach plans to increase the capacity of the its WTP to 35 MGD by 2020 and 38 (MGD) by 2025. These water supply system improvements planned by the City of North Miami Beach will provide water supply for those portions of unincorporated and incorporated Miami-Dade County which are currently served by the City of North Miami Beach.

5.4.3 City of Homestead

The City of Homestead is currently in the process of analyzing the different ways of improving or expanding their systems to increase capacity as the population within its municipal boundary and in parts of unincorporated Miami-Dade County where it provides water increases. The two major alternatives are either upgrading the existing well pumping capacity or installing additional wells. However, the City has not yet agreed on any type of improvements, and therefore no additional information can be provided at this time.

5.4.4 Florida City

Due to the fact that the SFWMD is currently adjusting any further withdrawals from the Biscayne aquifer, the City plans to increase its Water Treatment Plant capacity by installing additional wells and withdrawing water from the Floridan aquifer, which will require membrane filtration treatment and chlorination prior to distribution. The timeline for this expansion is not yet known.

5.5 Conclusion

In conclusion, and as **Table 5-2** shows, MDWASD has prepared a work plan which demonstrates that the Department (e.g. public) facilities are available to meet the projected growth demands (which reflect credits for conservation). The current permit and the limiting conditions are located in Appendix H, and the permit modification request is located in Appendix I.

Section 6
Climate Change and Sea Level Rise Plan

This section details MDWASD evaluation and planning for sea level rise and climate change over the planning horizon in this document. The primary concern to MDWASD water supply is salt water intrusion into the freshwater Biscayne aquifer, the primary source of drinking water in Miami-Dade County. Results of evaluation and data analysis completed to date indicate that within the next thirty years MDWASD will be able to operate its wellfields and water treatment facilities as designed, as groundwater modeling indicates even with a high level of projected sea level rise our wellfields will not be impacted by salt water intrusion. Further modeling is currently underway to extend the planning scenarios fifty years out, and will include climate change such as increases and decreases in annual precipitation, and extreme weather events.

6.1 Introduction

Southeast Florida is one of the most vulnerable regions to the impacts of climate change and sea level rise as a result of our flat topography, porous limestone geology, and dense coastal development. Climate change and sea level rise are expected to present significant challenges relating to water resource planning, management and infrastructure for the counties located in south Florida, including Broward, Miami-Dade, Monroe, and Palm Beach Counties. These counties have agreed to partner in regionally-coordinated climate mitigation and adaptation strategies as part of the Southeast Florida Regional Climate Change Compact and have adopted a Regional Climate Action Plan which highlights "Water Supply, Management, and Infrastructure" as a primary focal area. (http://southeastfloridaclimatecompact.org/). Investigations and evaluations conducted at the national, regional, and local levels have reinforced the need to plan for the predicted impacts of more frequent and severe drought, increases in tidal and storm-related flooding, and the loss of coastal wellfield capacity due to saltwater intrusion. In the absence of proactive planning, these impacts will present liabilities for coastal and inland communities with implications for urban water supplies, water and wastewater infrastructure, and both regional and local drainage/flood control systems. Investments in water supply planning and infrastructure that account for these predicted trends will improve the resilience of our communities, provide public health benefits, and reduce the potential for economic losses.

Miami-Dade County along with Broward, Monroe, Palm Beach Counties, local governments and water utilities in the southeast Florida region have begun to formalize the integration water supply and climate change considerations as part of

coordinated planning efforts, including updates to local government and water utility 10 year Water Supply Facility Work Plan and enhancements to local government's Comprehensive Plans. Key considerations for communities within the four County Compact planning area areas include: 1) sea level rise, 2) saltwater intrusion, 3) extreme weather, and 4) infrastructure investments to support diversification and sustainability of water supply sources, and adaptive stormwater and wastewater systems. Sea level rise produces varied challenges with the respect to water resources sustainability, water management, and water/wastewater facilities and infrastructure. Impacts include salt water intrusion into coastal wellfields, infiltration of groundwater with chloride levels into wastewater collection systems, impairing normal operations and maintenance as well as challenges for beneficial use of reclaimed water as an alternative water supply. Water management systems are also at risk with systems constrained by rising groundwater and canal gate tailwater elevations, which reduce soil storage and discharge capacity, with increased potential for both inland and coastal flooding.

6.2 Miami-Dade County Sea Level Rise and Climate Change Recent Government Action

As part of the Miami-Dade County Evaluation and Appraisal Report adopted in 2011, climate change was identified as one of the priorities to address in the County's Comprehensive Development Master Plan (CDMP). Miami-Dade has incorporated climate change considerations and language in several of the Elements of the CDMP update which was approved by the Board of County Commissioners in October, 2013.

The Miami-Dade Sea Level Rise Task Force was created by Resolution R-599-13 on July 2, 2013 to review the relevant data and prior studies, assessments, reports, and evaluations of the potential impact of sea level rise on vital public services and facilities, real estate, water and other ecological resources, water front property, and infrastructure (http://www.miamidade.gov/planning/boards-sea-level-rise.asp). Their recommendations included in the June 2014 Final Report Recommendation 4:

> *While recognizing the recent efforts to address flood protection and saltwater intrusion by the South Florida Water Management District and the Miami-Dade County, the Sea Level Rise Task Force recommends that Miami Dade County work jointly with the District and the SE Climate Compact partners to conduct a comprehensive study and develop adaptation strategies to address potential flood damage reduction and saltwater intrusion associated with sea level rise. This strategy should expeditiously address rising sea levels, a time frame for implementation, and a potential funding mechanism.*

Miami-Dade Board of County Commissioners adopted in September an ordinance relating to the rules of procedures of the Board of County Commissioners amending Section 2-1 of the Code of Miami-Dade County, Florida, to require that in all agenda items related to planning, design, and construction of county infrastructure a statement be included that the impact of sea level rise has been considered (File 141211 http://www.miamidade.gov/govaction/matter.asp?matter=141211&file=true&yearFolder=Y2014).

6.3 Saltwater Intrusion

Along the coast of southeast Florida, and several miles inland, groundwater supplies and potable wells are vulnerable to saltwater contamination. The Biscayne Aquifer, which serves as the region's primary water supply, is a shallow, surficial aquifer characterized by limestone karst geology which is highly porous and transmissive. Salt water intrusion is defined by the South Florida Water Management District (SFWMD) as chloride concentrations exceed drinking water standards of 250 mg/l. The SFWMD has identified "Utilities at Risk" for salt water intrusion, which include utilities with wellfields near the saltwater/freshwater interface that do not have an inland wellfield, have not developed adequate alternative sources of water, and have limited ability to meet user needs through interconnects with other utilities; and "Utilities of Concern", which include utilities having wellfields near the saltwater/freshwater interface, the ability to shift pumpages to an inland wellfield, or an alternative source that is not impacted by the drought (SFWMD, 2007). Miami-Dade WASD wellfields included as "Utility at Risk" are South Miami-Dade Wellfields (Newton, Elevated Tank, Naranja, Leisure City, Roberta Hunter- Caribbean Park). MDWASD Utilities of Concern include the North and Central Miami-Dade Wellfields (Hialeah-Preston and Alexander Orr) (Figure 1).

Figure 6-1. Utilities and Risk and Utilities of Concern, Miami-Dade County (SFWMD, 2007).

6.3.1 Salt Intrusion Monitoring Network

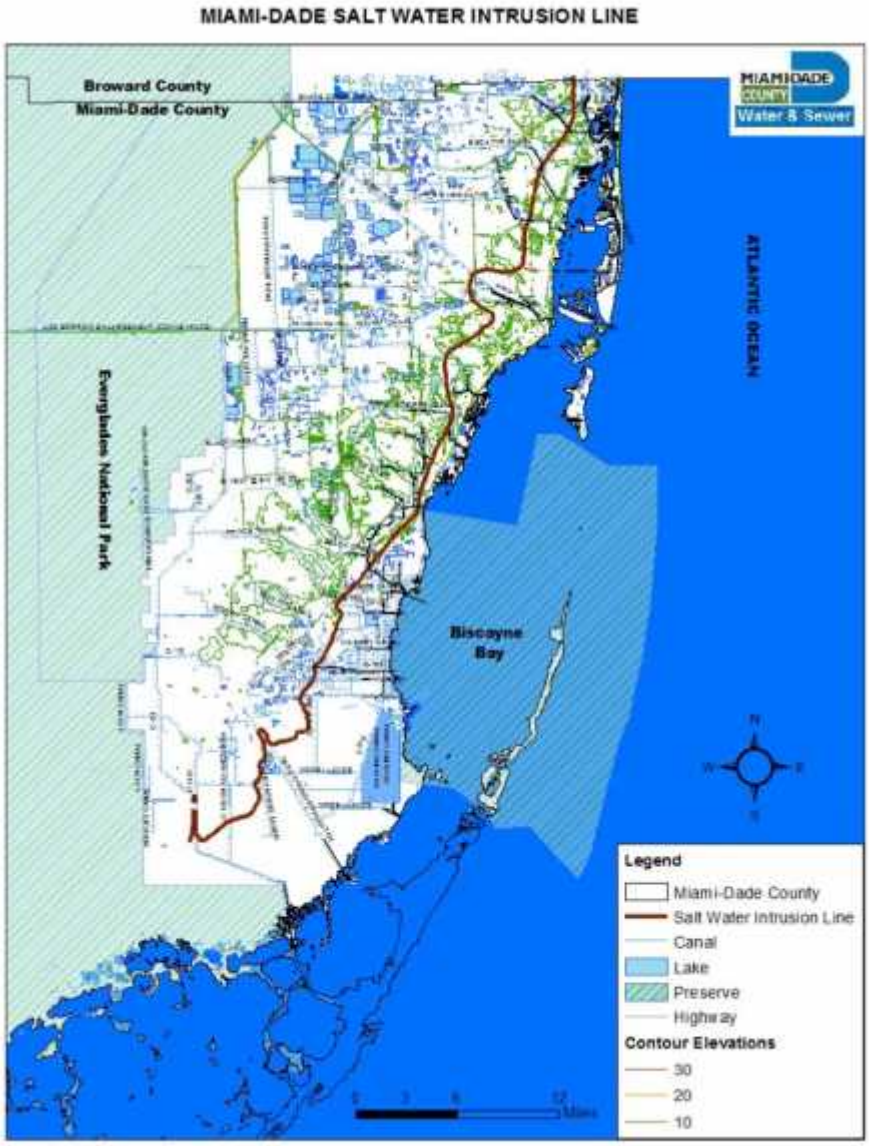
Saltwater intrusion in Miami-Dade County is monitored through a joint effort of the Miami-Dade Water and Sewer Department (MDWASD), Miami-Dade Department of Regulatory and Economic Resources (RER), and the U.S. Geological Survey (USGS). A network of small diameter wells have been drilled to the base of the aquifer to serve as monitor wells to identify the location of the saltwater

intrusion front. The salt front is identified as the location, at the base of the aquifer, of the 1,000 milligrams/per liter (mg/L) isochlor, or line of equal chloride concentration of 1,000 mg/L). Sampling of the monitor wells is done by the USGS, under a co-operative Joint Funding Agreement (JFA) contract with Miami-Dade County for wells currently included in the salt front monitoring program (JFA #14GGESMC0000109). Additional wells are sampled quarterly or yearly basis depending on well location, but every year the sampling schedule includes a county-wide sampling event conducted at the height of the dry season to coincide with the time when inland movement of the saltwater front would be at its peak. The data derived from that sampling is used by the USGS to identify any significant movement of the salt front, and to map the location of the salt front if a significant movement is evident. MDWASD reports the data to the South Florida Water Management District (SFWMD) quarterly, as part of the WUP #13-00017-W requirements, and is required as part of Limiting Condition 37 of the 20-Year WUP (SFWMD, 2007; Appendix H) to submit an annual report summarizing the data collected and recommendations for adjustments to the salt front monitoring network as a result of data analysis.

6.3.2 Salt Intrusion Front Delineation

Miami-Dade WASD entered into a JFA with the USGS in 2007 (JFA #08E0FL208004) to delineate the current extent of saltwater intrusion in the Biscayne aquifer, to characterize how the extent has changed since the last mapping effort, to improve salinity monitoring in the Biscayne aquifer and to identify the sources of the saltwater to better understand the actions required to prevent or mitigate saltwater intrusion. As part of this effort eleven new monitoring wells have been installed in areas where there was insufficient information to identify the location of the front, and data from geophysical tools and techniques were incorporated into the analysis. To improve accessibility of salinity monitoring information to the public, the USGS cooperative water conditions website was improved and a new website created. "Saline Intrusion Monitoring, Miami-Dade County, Florida," serves data collected during this study, as well as data from the active salinity monitoring network, and provides the interpreted maps of the inland extent of saltwater intrusion (*http://www.envirobase.usgs.gov/FLIMS/SaltFront/viewer.htm*, U.S. Geological Survey, 2011g). This website allows the USGS to deliver timely hydrologic data, analyses, and decision-support tools concerning saltwater intrusion. As a result of the JFA, an updated salt front map was published in 2011 (Figure 2) and the final report summarizing the study and recommendations and conclusions published in 2014 (Prinos, et. al. 2014).

Figure 6-2. Salt Water Intrusion extent, Miami-Dade County, FL. (USGS 2011)



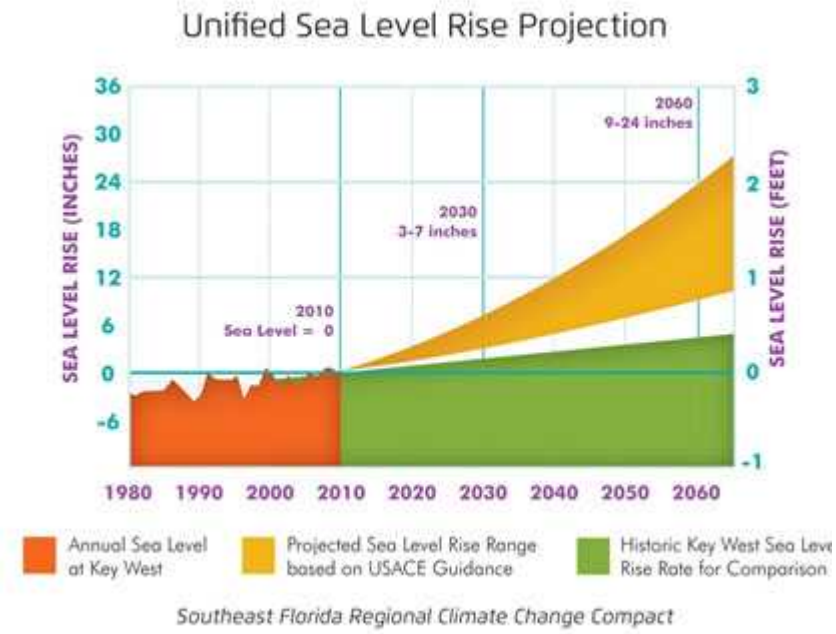
6.4 Urban Miami-Dade County Surface Water/Groundwater Model

Miami-Dade County entered into a Joint Funding Agreement (JFA 08E0FL20817) with the USGS in February 2008 to develop an integrated surface/groundwater numerical flow model, with one of the objectives of the project to evaluate if sea level rise will cause salt water intrusion into coastal wellfields. The numerical model is designed among other uses to evaluate if the current surface-water structure control operational criteria effectively control saltwater intrusion with projected population increase and sea level rise. MDWASD and the USGS use this integrated surface-water/groundwater model to evaluate how the position of the freshwater/saltwater interface will change with increased well field pumpage, increased sea level, and a combination of increased well field pumpage and increase sea level.

The model was developed and calibrated a coupled surface-water/groundwater model of the urban areas of Miami-Dade County, Florida. The model is designed to simulate surface-water stage and discharge in the managed canal system and dynamic canal leakage to the Biscayne aquifer as well as seepage to the canal from the aquifer. The model was developed using USGS MODFLOW-NWT with the SWR1 Process and the SWI2 Package to simulate the surface-water system and seawater intrusion, respectively (Hughes et. al., 2013). Automated parameter estimation software (PEST) and highly-parameterized inversion techniques were used to calibrate the model to observed surface-water stage, surface-water discharge, net surface-water sub-basin canal discharge, and groundwater level data from 1997 through 2004 by modifying hydraulic conductivity, specific storage coefficients, specific yield, evapotranspiration parameters, canal roughness coefficients (Manning's *n* values), and canal leakance coefficients (Walsh and Hughes, 2014).

MDWASD and the USGS used the modified guidance developed by the U.S. Army Corps of Engineers (USACE, 2011) and a planning scenario of 9 to 24 inches additional rise by 2060, consistent with projections presented in the 2014 NCA, and formally adopted by the partner counties in the Southeast Florida Regional Climate Change Compact (Figure 3) for the modeling effort.

Figure 6-3: Unified Southeast Florida Sea Level Rise Projection for Regional Planning Purposes



The USGS has completed the preliminary model and initial scenarios regarding sea level rise, and results are pending publication (USGS, verbal communication). The model simulation period is from 1/1/1996 to 12/31/2010, with daily surface-water and groundwater timesteps. The model was calibrated using highly-parameterized inversion methods, with an 8 year calibration period (1997-2004) and a 6 year verification period (2005-2010). To represent future conditions, 30-year scenario simulation periods representing conditions from 2011 through 2040 were run. The thirty year scenario period was chosen as being scientifically defensible at this point in time with available sea level rise and climate change data available.

Four scenarios have been completed to date, and will be included in the pending publication:

- ***Base scenario***
  - Daily 2010 well field withdraws repeated for 30 year daily
  - meteorological data set (recycled twice)
  - 2008 land use
  - Predicted Virginia Key tidal stage with current linear rate of SEA LEVEL RISE-0.5 ft over 30 years

  - Everglades Depth Estimation Network (EDEN) data set (recycled twice)
  - Historical structure operations - effective gate openings

- ***Scenario 1***
  - Base scenario
  - Increased WASD well field withdrawals - increased rates provided by WASD (WUP 2012 allocations)

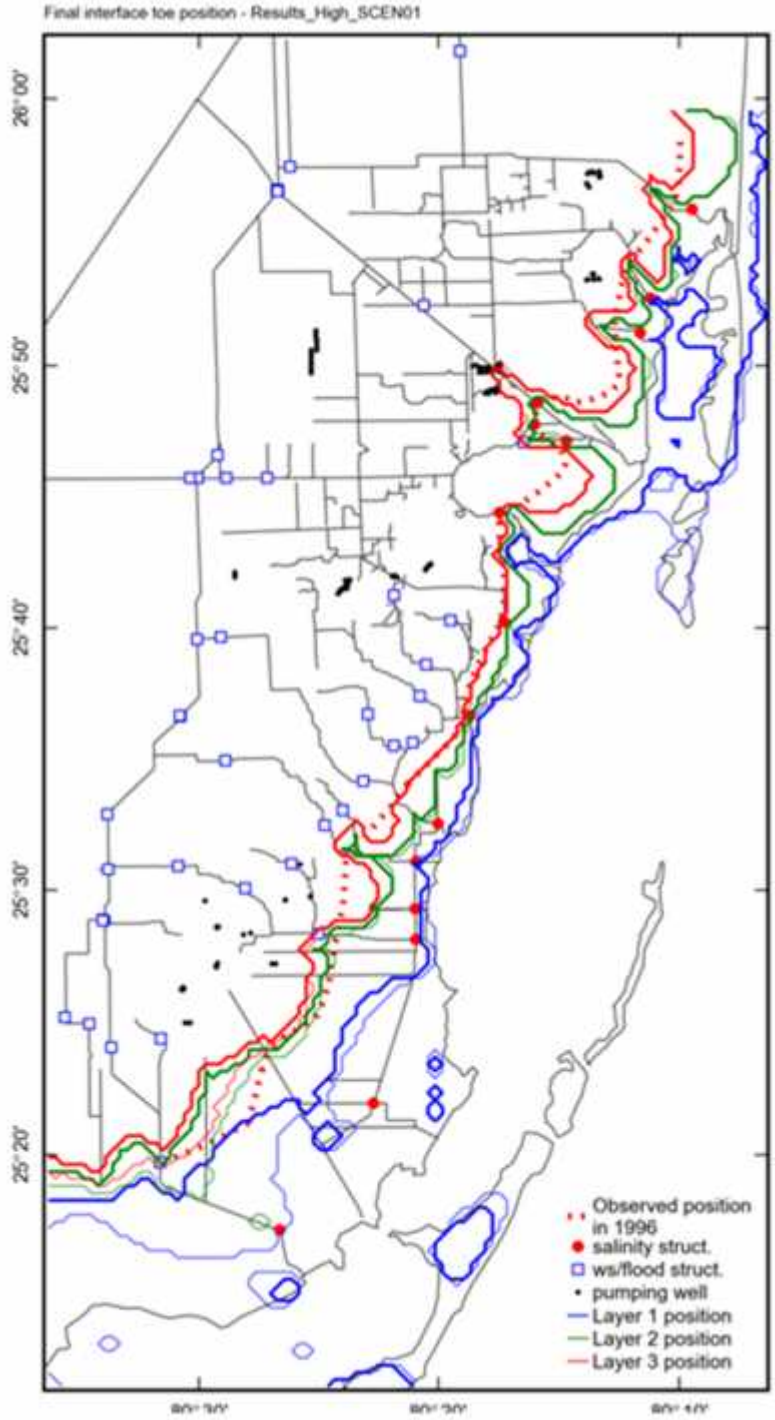
- ***Scenario 2***
  - Base scenario
  - High sea-level rise rate (NRC III rate - 1.23 ft increase over 30 years) added to predicted
  - Virginia Key tidal stage
  - Blend EDEN data and increased sea level where needed

- ***Scenario 3***
  - Scenario 2
  - Increased WASD well field withdrawals at permitted 2025 allocations

Therefore, Scenario 3 represents the high-level rate of sea level rise and the permitted wellfield withdrawals allocated in the SFWMD 20-Year WUP. Results of Scenario 3 indicate minimal change in the salt front (Figure 4).

As a result of the USGS Salt Front JFA, and the on-going salt front monitoring, and the groundwater flow modeling project, Miami-Dade WASD wellfields are not considered at risk for salt water intrusion within the next ten years.

Figure 6-4. Scenario 3 Salt Water Intrusion Results. (Walsh and Hughes, 2014).



6.5 Extreme Weather Events

As extreme events increase in frequency and severity, MDWASD will consider impacts and risks associated with drought, water shortages and reduced groundwater tables, all of which can hasten saltwater intrusion and exacerbate water supply impacts. Conversely, more intense and rapid rainfall will cause flooding, increased runoff, impacts to the natural systems and provide less recharge potential. Integrated water resources management strategies will help to mitigate for these impacts, particularly those projects that can serve to provide additional storage of stormwater runoff, long term storage, and redistribution of excess rainfall during dry periods and drought. Regional surface water reservoirs and belowground aquifer storage and recovery systems are potentially viable alternative water supply projects and climate adaptation strategies. Increases in groundwater elevations, in both direct and indirect response to sea level will challenge the function of drainage systems and is expected contribute to exacerbate flooding, for even mild storm events. Conditions will be more severe with extreme rainfall events can increase damage to lowlying utility infrastructure and contribute to prolonged surface water flooding. Planning for the combined influences of storm events, high tides and sea level rise on drainage system functions and other public infrastructure is a critical need as is the assessment of viable water supplies and impacts to the natural systems from prolonged droughts.

MDWASD has entered into a JFA in 2014 (JFA 14GGESMC0000110) with the USGS to continue the modeling effort, and will develop additional future scenarios with County Departments, local governments, regional agencies for further climate change and sea level rise assessment. These scenarios will include additional years simulation, changes in recharge as a result of climate change, land use changes, and revised sea level rise projections. Future model scenarios to be developed with the USGS include simulating extreme weather events superimposed on future conditions as simulated in model runs.

6.6 Infrastructure Assessment

Effective water treatment plant operations require proper control of flooding from both stormwater (riverine) and tidal sources. Comprehensive engineering analysis considers both short-term and long-term effects of climate change. Short-term effects, such as current increased sea levels and higher estimates of tidal boundary conditions, will be incorporated into the system design and operations as necessary. Potential longer-term climatic changes are typically addressed incrementally as needed through systems master planning, to provide the appropriate level of protection for the given time period, including:

- Greater levels and rates of sea level rise,
- Higher spring tides (exceptionally high astronomical tides that occur around the new and full moon when the planets align to exert maximum effect on the tides),
- Higher tidal boundary effects and backflow,
- Increased levels of tidal surge and wind and wave effects from tropical storms and hurricanes, and
- Potential changes in design rainfall depths and intensities.

MDWASD requires capital improvement projects to include an assessment of climate change and sea level rise. Background information on the site stormwater and tidal conditions is required for site specific projects, and assessment includes projections of potential increases in sea levels, potential ranges of effects on the WTP stormwater management system, and site grading considerations and access for proper operations. The Miami-Dade County hydrologic and hydraulic model XP-SWMM is used to develop peak stage and flood inundation maps. XPSWMM uses a node-link architecture to dynamically route rainfall-runoff through pipe networks and open channels. A variety of data can be analyzed (example FDEP and NOAA tidal data, canal stage data, tidal stillwater data) to adequately assess MDWASD operational sites' vulnerability to continued sea level rise and to provide for potential adaptation options (CDM Smith, 2013).

References

CDM Smith, 2013. Technical Memorandum *Miami-Dade Water and Sewer Department PSA No. 01CDAM003 – Task Authorization No. 12 South Miami Heights (SMH) Water Treatment Plant (WTP) Program Climate Change Adaptation Review*

http://www.envirobase.usgs.gov/FLIMS/SaltFront/viewer.htm

http://www.miamidade.gov/govaction/matter.asp?matter=141211&file=true&yearFolder=Y2014

Hughes, J.D., Langevin, C.D., Chartier, K.L., and White, J.T., 2012, *Documentation of the Surface-Water Routing (SWR1) Process for modeling surface-water flow with the U.S. Geological Survey Modular Ground-Water Model (MODFLOW–2005)*: U.S. Geological Survey Techniques and Methods, book 6, chap. A40 (Version 1.0), 113 p.

Miami-Dade County, July 1, 2014. *Miami-Dade Sea Level Rise Task Force Report and Recommendations (http://www.miamidade.gov/planning/boards-sea-level-rise.asp)*

Prinos, S.T., Wacker, M.A., Cunningham, K.J., and Fitterman, D.V., 2014, *Origins and delineation of saltwater intrusion in the Biscayne aquifer and changes in the distribution of saltwater in Miami-Dade County, Florida*: U.S. Geological Survey Scientific Investigations Report 2014–5025, 101 p., *http://dx.doi.org/10.3133/sir20145025*.

South Florida Water Management District, 2007. *Utilities of Concern in the Lower East Coast Region and Lake Okeechobee Service Area*.

Southeast Florida Regional Climate Change Compact, *http://southeastfloridaclimatecompact.org/*

U.S. Geological Survey, 2007 Joint Funding Agreement 08E0FL208004 *Assessment of seawater encroachment and seawater encroachment monitoring network improvements in Miami-Dade County, Florida.*

U.S. Geological Survey, 2008. Joint Funding Agreement 08E0FL208017 *An integrated model of surface and groundwater flow for evaluating the effects of competing water demands in Miami-Dade County.*

U.S. Geological Survey, 2013. Joint Funding Agreement 14GGESMC0000109 *Investigations of Water Resources.*

U.S. Geological Survey, 2014. Joint Funding Agreement 14GGESMC0000110 *Aquifer hydrogeologic framework, modeling tools and evaluating sea-level rise, Miami-Dade County.*

USACE Engineering Circular 1165-2-212: *Sea-Level Change Consideration for Civil Works Programs* USACE, 2011.

Walsh, V, and J. Hughes. 2014. *Urban Miami-Dade County Surface-Water/Groundwater Model – Application for Sea-Level Rise Evaluation.* 23rd Annual Southwest Florida Water Resources Conference, Fort Myers, FL. January 31, 2014

EXHIBIT “B”

CITY OF DORAL, FLORIDA

20-YEAR WATER SUPPLY FACILITIES WORK PLAN

August __, 2015

CITY OF DORAL, FLORIDA
20-YEAR WATER SUPPLY FACLITIES WORK PLAN

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1.0 INTRODUCTION

The goal of the water supply planning process is to determine the local water needs and develop sound and workable solutions and polices to meet those needs. The purpose of the City of Doral 20-Year Water Supply Facilities Work Plan (Work Plan) is to identify and plan in coordination with Miami-Dade Water Sewer Department (WASD) water supply sources and facilities needed to serve existing and new development within the local government's jurisdiction.

Chapter 163, Part II, F.S., requires local governments to prepare and adopt Work Plans into their comprehensive plan within 18 months after the South Florida Water Management District (the "District") approves a regional water supply plan or its update. The City of Doral is located in the District's southeast Florida region (Figure 1). WASD and the City of Doral are part of the *Lower East Coast Water Supply Plan Update* Regional Water Supply Plan, originally approved by the District's Governing Board on February 15, 2007. The second update, adopted on September 12, 2013, assesses the Lower East Coast Planning Area's existing and projected water needs and water sources to meet those needs from 2010-2030. This update also describes proposed water supply projects, regional resource projects and implementation strategies for Fiscal Year 2010-2030. As indicated, local governments within the Lower East Coast jurisdiction are responsible for amending their comprehensive plans, facility work plan and ordinances by March of 2015.

The residents of the City of Doral obtain their water from WASD, which is responsible for ensuring enough capacity to meet existing and future customers water needs. In addition to serving the City, WASD is the designated regional supplier of potable water for most of the cities in Miami-Dade County. In that capacity, the WASD supplies the City of Doral's residential and non-residential property owners with potable water on a retail basis (Figure 2) at a rate determined by WASD. WASD owns, operates, and maintains a central potable water distribution system, along with the facilities for collection and treatment of water, which then transmits the potable water to its citizens throughout the majority of Miami-Dade County.

The City recognizes that in order to maintain a water supply system and conservation program there must be effective coordination with WASD and the District. The City has an excellent working relationship with WASD and the District to ensure compliance with all regulations and guidelines. In addition, the City's Public Works and Planning and Zoning Departments through the development approval process coordinates with WASD to ensure enough supply is available for existing and future customers and supporting infrastructure is adequately maintained.

Since the City has limited legislative authority and does not provide services, the City's 20-Year Water Supply Facilities Work Plan (Work Plan) will reference the initiatives already identified in Miami-Dade County's 20-Year Work Plan. A copy of the Miami Dade County's 20-Year Water Supply Facilities Work Plan (2014-2033) is provided in Appendix A.

The Work Plan will reference the initiatives already identified by WASD to ensure adequate water supply for the City of Doral. According to state guidelines, the Work Plan and the comprehensive plan must address the development of traditional and alternative water supplies, service delivery and conservation and reuse programs necessary to serve existing and new development for at least a 10-year planning period.

The City's Work Plan is divided into five sections:

Section 1 – Introduction
Section 2 – Background Information
Section 3 – Data and Analysis
Section 4 – Work Plan Projects/Capital Improvement Element/Schedule
Section 5 – Goals, Objectives, Policies

1.1 Statutory History

The Florida Legislature enacted bills in the 2002, 2004, 2005 and 2011 sessions to address the state's water supply needs. These bills, especially Senate Bills 360 and 444 (2005 legislative session), significantly changed Chapter 163 and 373 Florida Statutes (F.S.) by strengthening the statutory links between the regional water supply plans prepared by the water management districts and the comprehensive plans prepared by local governments. In addition, these bills established the basis for improving coordination between the local land use planning and water supply planning.

1.2 Statutory Requirements

The City of Doral has considered the following statutory provisions when updating the Water Supply Facilities Work Plan:

1. Coordinate appropriate aspects of its comprehensive plan with the *Lower East Coast Water Supply Plan Update* Regional Water Supply Plan [163.3177(4)(a), F.S.]
2. Ensure that its future land use plan is based upon availability of adequate water supplies and public facilities and services [s.163.3177(6)(a), F.S.]. Data and analysis demonstrating that adequate water supplies and associated public facilities will be available to meet projected growth demands must accompany all proposed Future Land Use Map amendments submitted for review.
3. Ensure that adequate water supplies and potable water facilities are available to serve new development no later than the issuance by the local government of a certificate of occupancy or its functional equivalent and consult with the applicable water supplier to determine whether adequate water supplies will be available to serve the development by the anticipated issuance date of the certificate of occupancy [s.163.3180 (2)(a), F.S.].
4. For local governments subject to a regional water supply plan, revise the General Sanitary Sewer, Solid Waste, Drainage, Potable Water, and Natural Groundwater Aquifer Recharge Element (the "Infrastructure Element"), within 18 months after

the water management district approves an updated regional water supply plan, to:

a. Identify and incorporate the alternative water supply project(s) selected by the local government from projects identified in the *Lower East Coast Water Supply Plan Update* Regional Water Supply Plan Regional Water Supply Plan, or the alternative project(s) proposed by the local government under s. 373.709(8)(b), F.S. [s. 163.3177(6)(c), F.S.];

b. Identify the traditional and alternative water supply projects, and the conservation and reuse programs necessary to meet water needs identified in the *Lower East Coast Water Supply Plan Update* Regional Water Supply Plan [s. 163.3177(6)(c), F.S.]; and

c. Update the Work Plan for at least a 10-year planning period for constructing the public, private, and regional water supply facilities identified in the element as necessary to serve existing and new development. [s. 163.3177(6)(c), F.S.].

5. Revise the Five-Year Schedule of Capital Improvements to include any water supply, reuse, and conservation projects and programs to be implemented during the five-year period. [s. 163.3177(3)(a)4, F.S.].

6. To the extent necessary to maintain internal consistency after making changes described in Paragraph 1 through 5 above, revise the Conservation Element to assess projected water needs and sources for at least a 10-year planning period, considering the *Lower East Coast Water Supply Plan Update* Regional Water Supply Plan, as well as applicable District Water Management Plan, as well as applicable consumptive use permit(s). [s.163.3177 (6)(d), F.S.]. The plan must address the water supply sources necessary to meet and achieve the existing an projected water use demand for the established planning period, considering the applicable regional water supply plan [s. 163.3167(9), F.S.].

7. To the extent necessary to maintain internal consistency after making changes described in Paragraphs 1 through 5 above, revise the Intergovernmental Coordination Element to ensure coordination of the comprehensive plan with the *Lower East Coast Water Supply Plan Update* Regional Water Supply Plan. [s.163.3177(6)(h)1., F.S.].

8. While an Evaluation and Appraisal Report is not required, local governments are encouraged to comprehensively evaluate, and as necessary, update comprehensive plans to reflect changes in local conditions. The evaluation could address the extent to which the local government has implemented the need to update their Work Plan, including the development of alternative water supplies, and determine whether the identified alternative water supply projects, traditional water supply projects, and conservation and reuse programs are meeting local water use demands [s.163.3191(3), F.S.].

2.0 BACKGROUND INFORMATION

2.1 Overview

The City of Doral was incorporated in 2003 as Miami-Dade County's 34th municipality and is located in the west central portion of the County. The City has a land area of approximately 15 square miles bounded by the Town of Medley adjacent to a portion of the northerly boundary and unincorporated Miami-Dade County to the north, south, east and west. The City of Doral is one of the most diverse and dynamic municipality in the State of Florida, and indeed the United States. Doral is a full service city, multi-cultural, residential, recreational, business and industrial community. From one golf course and country club, and many farms in the late 1950's Doral has grown into a full-fledged city of over 50,000 residents today. According to the US Census Net International Migration Branch, in 2014, the City had the second highest percentage increase in population growth (Pop. 48,179 (2012) – 50,213 (2013) or an increase of 4.2%) in Florida. The City is also one of the largest employment centers in Miami-Dade County with a large industrial and commercial base.

For purposes of updating the Water Supply Facilities Work Plan the WASD populations' projections shall be utilized. The Miami-Dade WASD 20-Year Water Supply Facilities Work Plan the municipal population projections are as follows: 50,545 in 2014(CIE Update); 51,357 by 2015 (CIE Update); 55,019 by 2020; 60,201 by 2025; 65,383 by 2030; 68,493 by 2033, and 70,566 by 2035. The 2014 and 2015 population estimates were derived from the City's CIE Update 2014. A review of and adjustments to these projections will be forthcoming post-2020 Census when new data becomes available for the City.

The City of Doral has operated under the Mayor-Council-Manager form of government since incorporation. Policymaking and legislative authority are vested in a governing council consisting of the mayor and four other council members. The Council, which is elected at large, is responsible among other things, for passing ordinances and resolutions, adopting the annual budget, appointing the City Manager, City Clerk and City Attorney. The City Manager is responsible for carrying out the policies and ordinances of the Council, for overseeing the daily operations of the government, and for appointing the heads of various departments.

2.2 Relevant Regional Issues

As the state agency responsible for water supply in the Lower East Coast planning area, the District plays a pivotal role in resource protection, through criteria used for Consumptive Use Permitting. As pressure increased on the Everglades ecosystem resource, the Governing Board initiated rulemaking to limit increased allocations dependent on the Everglades system. As a result, the Regional Water Availability Rule was adopted by the Governing Board on February 15, 2007 as part of the SFWMD's water use permit program. This reduced reliance on the regional system for future water supply needs, mandates the development of alternative water supplies, and increasing conservation and reuse.

The regional issues identified for 2030 in the *Lower East Coast Water Supply Plan Update* Regional Water Supply Plan are:

1. Increased withdrawals from both the Surficial Aquifer System and surface water from Lake Okeechobee are limited
2. Conservation continues to be relied upon to reduce per capita use and a means to potentially delay or perhaps avoid adding capacity
3. Use of reclaimed water continues to be important alternative source in the region and helps to meet requirements of the 2008 Leah G. Schad Ocean Outfall Program

3.0 DATA AND ANALYSIS

The intent of the data and analysis section of the Work Plan is to describe the information that the City of Doral needs to provide to state planning and regulatory agencies as part of their proposed comprehensive plan amendments, particularly those that would change the Future Land Use Map (FLUM) to increase density and/or intensity.

3.1 Population Information

This section is a narrative summarizing population information describing coordination with the population projections from the City's Comprehensive Plan, Capital Improvement Element (CIE) FY 2014 Update Report, WASD Water Supply Facilities Work Plan, and the District's Regional Water Supply Plan. The population projections used should be consistent throughout the comprehensive plan, including the tables in Section 3.4 which will contain more detailed population and demand projections. Information from the perspective of the entire jurisdiction should be included, with separate paragraphs addressing information for each specific utility service area serving the City of Doral. In 2012-13, the US Census Bureau revised the city's estimated population figures. The new population estimates for 2013 placed the city at 50,213 residents. This represents an increase of over 4.2 percent over prior year. Furthermore, this increase placed the city as one of the fastest growing local government in Florida.

The 2014 population estimates were derived from the CIE FY 2014 Update. The City uses population projections to determine the public facility needs for the next 5-year planning period since several portions of the City are build-out with the exception of a few very large tracts of land. According to the CIE Update FY 2014, vacant land analysis in the Comprehensive Plan, at build out the City's population should peak at approximately 80,000." The population projections from 2020-2035 was derived from the Miami-Dade County WASD Water Supply Facilities Work Plan, Retail Municipal Customers Water Demand Projections, Exhibit C-8, dated November 2014. WASD population data were obtained from Miami-Dade County Department of Regulatory and Economic Resources (RER), Planning Division, based on the 2010 Census and derived from Transportation Analysis Zones (TAZ). On June 20, 2014, WASD submitted an application for modification and extension to the 20-year Water Use Permit (WUP) No. 13-00017-W. (Appendix B) The modification and extension to the current WUP are a result of revised population projections based on the 2010 Census and the continued successful implementation of the County's Water Conservation Plan. The revised

population projections for the year 2030 are consistent or slightly lower, than the projections in the District's Lower East Coast Water Supply Update, dated October 2013.

Table I
City of Doral
Population Projections
20-Year Water Supply Facilities Work Plan

No.	Year	Comprehensive Plan (CIE Update 2014)[1]	MDWASD Doral Propulation Projections[2]
1	2014	50545	
2	2015	51357	
3	2020		55019
4	2025		60201
5	2030		65383
6	2033		68493
7	2035		70566

Source:

1. City of Doral. CIE Update 2014. Population Estimates and Projections. June 16, 2014.
1. Miami-Dade WASD Water Supply Facilities Work Plan Retail Municipal Customers Water Demand Projections Exhibit C-8. November 2014.

3.2 Maps of Current and Potential Future Areas Served

Presently, WASD supplies water to a total of 15 wholesale customers and 15 municipal retail customers (including the City of Doral), and areas of unincorporated Miami-Dade County. In 2013, WASD served approximately 86 percent of the County total population (Population Served by WASD – 2,266,092; County Total Population 2,631,629). The map(s) depicting current and future City of Doral boundaries served by WASD is provided in Figure 3. The water distribution service area for the City includes only areas within its municipal boundaries. This means that the population within the municipal boundaries is also the population served within the City's "water service areas." WASD will continue to serve the City's retail customers within its municipal boundaries. If said municipal boundaries were expanded through annexation WASD would continue to serve the annexed areas.

3.3 Potable Water Level of Service Standard

On April 26, 2006, the City adopted its Comprehensive Development Master Plan. Policy 5A.1.1 (Portable Water Sub-element) and Policy 10.4.1 of the Capital Improvement Element set forth a level of services (LOS) standards for portable water consumption at 200 gallons per capita per day (gpcd) consumption. Policies 5A.1.1 and 10.4.1 also establish the LOS for fire flow minimum delivery pressure to be between 20

and 100 pounds per square inch (psi) based upon land use served. In 2015, the City of Doral water demand projection baseline consumption per capita established by WASD is 126.8 gallons per capital per day (gpcd), while Miami-Dade County water projections was 136.9 gpcd (20-year WUP 13-00017-W and 5-Year Water Efficiency Plan Goal).

Objective 5A.1of the City Comprehensive Plan Portable Water Sub-element, requires continue coordination with Miami-Dade County WASD to provide potable water facilities to meet the existing and projected demands based on LOS standards consistent with State Statues and implement procedures to ensure that any future potable facility deficiencies are corrected. The evaluation measure for the Portable Water Sub-element requires all development applicants to meet the LOS standard for portable water facilities and ensure that provisions of adequate facilities are available prior to development. As part of the site plan approval process, development application must include a letter from the County's Permitting, Environmental and Regulatory Affairs, Department of Regulatory and Environmental Resources, acknowledging that the system has sufficient capacity to meet the project water demand.

The City at this time does not consider the need for revisions to or additional standards for residential and non-residential uses within the water distribution service area.

3.4 Population and Potable Water Demand Projections by Each Local Government or Utility

The population estimates and the potable water demand projections generated by WASD are presented below in Table II. The projections are through the year 2035. The water demands are for finished water. As indicated, the City obtains its water from WASD. The City does not have a bulk purchase agreement with an outside entity.

Table II
City of Doral
Population and Water Supply Demands
20-Year Water Supply Facilities Work Plan

	WATER SUPPLY UTILITY SERVICE WITHIN WATER DISTRIBUTION SERVICE AREA*											
SERVICE AREA	POPULATION PROJECTIONS						WATER SUPPLY DEMAND (MGD)					
YEAR	2015	2020	2025	2030	2033	2035	2015	2020	2025	2030	2033	2035
Doral	51,357	55,019	60,201	65,383	68,493	70,566	6.5130	6.7945	7.3558	7.9958	8.3901	8.6530
Other within Doral SA	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	51,357	55,019	60,201	65,383	68,493	70,566	6.5130	6.7945	7.3558	7.9958	8.3901	8.6530

* Source – Miami-Dade County. WASD Water Supply Facilities Work Plan, November 2014. Exhibit C-8.

3.5 Water Supply Provided by Local Government

The City of Doral does not provide water and/or sewer services to its residential and non-residential uses within the city's jurisdictional boundaries. The City of Doral water and sewer infrastructure including treatment facilities are own and operated by WASD.

WASD distribution system supplies adequate pressures so that high service pumps are not required to be owned or maintained by the City to maintain adequate delivery pressures.

3.6 Water Supply Provided by Other Entities (Miami-Dade Water and Sewer Department)

As indicated, WASD is the designated regional supplier of potable water to the City of Doral and 86% of Miami-Dade County total population. In that capacity, WASD supplies the City of Doral's residential and non-residential property owners with potable water on a retail basis (Figure 2) at a rate determined by WASD.

WASD owns, operates, and maintains a central potable water distribution system, along with the facilities for collection and treatment of water, which then transmits the potable water to its citizens throughout the majority of Miami-Dade County including those in Doral. Currently, WASD water distribution system is supported by three regional treatment plants, five (5) smaller treatment plants located in the southern portion of Miami-Dade County, and the Hialeah RO (Reverse Osmosis) Water Treatment Plant. The distribution systems serving these treatment plants are comprised of loops and interconnected transmission lines.

The City of Doral is served by the Hialeah-Preston Subarea. The Hialeah-Preston Subarea is comprised of dedicated low-pressure pipelines, remote storage tanks, pumping facilities and high pressure systems. The southwestern portion of the Hialeah-Preston water distribution facilities subarea, which includes the City of Doral, is supplied by a 36-inch diameter main that connects to the 54-inch diameter main heading out of the John E. Preston WTP at West 25th Street in Hialeah. The main heads west on NW 74th Street then turns south on NW 107th Avenue. It eventually interconnects with the Alexander Orr, Jr. subarea piping network on SW 56th Street around SW 117th Avenue.

As indicated in the WASD Water Supply Facilities Work Plan, the water supply and treatment systems have sufficient installed capacity to produce more portable water than is currently required to meet the needs of the City of Doral and other retail customers. The supply capacity and treatment capacity are 724.44 MGD and 517.19 MGD, respectively. The capacities of these water supply and treatment systems have been coordinated with future demands and allocations.

On November 15, 2007, permit 13-00017-W was renewed and consolidated all facilities and water demands of permits 13-00017-W, 13-00037-W and 13-00040-W into one permit. It was issued for a 20-year period, an annual allocation of 152,741 MGY (418.47 MGD), and a maximum monthly allocation of 13,364 MGM. Along with the existing wellfields and the proposed South Dade wellfield, a new Floridan aquifer wellfield and reverse osmosis plant were proposed in Hialeah. The Biscayne aquifer base condition was established at 347 MGD, pursuant to Section 3.2.1E of the BOR, Regional Water Availability. Additional groundwater modeling conducted during the permit review showed that an additional 5.0 MGD (1.5 MGD at Snapper Creek, 1.5 MGD at Southwest, 0.5 MGD at Newton and 1.5 MGD at Everglades' wellfields) would not

cause a net increase in volume or cause a change in timing of surface and groundwater from Everglades' water bodies. Groundwater and canal recharge projects were required to offset proposed increased Biscayne aquifer withdrawals beyond the calculated Base Condition limit of 347 MGD.

On November 1, 2010, the consolidated permit (13-00017-W) was modified (to remove proposed FAS blending wells and re-start the existing ASR wells) and renewed for a 20 year duration, with an annual allocation of 149,106 MGY (408.51 MGD) and a maximum monthly allocation of 13,047 MGM to provide potable water to a projected population of 2,787,451 persons in the year 2030.

On July 16, 2012, the South Florida Water Management District Water Use Permit No. Re-Issue 13-0017-W Non-Assignable to Miami-Dade Water and Sewer Department. (Appendix B) This permit authorized the increased use of ground water from the upper Floridan Aquifer and Biscayne Aquifer for public water supply for county wide system serving 2,787,451 persons in the year 2030 with an average per capita use rate of 147 gallons per day and a maximum monthly to average monthly pumping ratio 1.06 with an annual allocation of 149,906.00 million gallons.

On June 20, 2014, WASD submitted an application to the South Florida Water Management District for the modification and extension of the "Water Use Permit No. 13-00017-W" to reflect the revised population projects (based on the 2010 Census) and continued successful implementation of the County's Water Conservation Plan. According to the Application, " the County's projected finished water demands are lower than anticipated when the first 20-year water use permit application was submitted, and this demand reduction has eliminated the anticipated supply shortage which were the basis for an ambitious schedule of several costly near-term alternative water supply projects that are longer required or needed." Under this modification WASD applied for 386.07 mgd or 24.63 mgd less than 410.70 mgd in the original permit. The reduction in projected finish water demand eliminated the need by the County to fund several costly alternative water supply projects in their entirely and postponed the need for other projects by several years.

On February 9, 2015, the South Florida Water Management District approved a revision to WASD's Water Use Permit #13-00017-W (Application #14-627-12). The purpose of this modification was provides WASD with a total annual allocation of 386.07 mgd (349.50 mgd from the Biscayne Aquifer and 36.60 mgd from the Floridan Aquifer). The new expiration date for WASD's Water Use Permit #13-00017 is February 9, 2035. A copy of Application #14-627-12 is provided in Appendix B.1.

The Miami-Dade County 20-Year Water Supply Facilities Work Plan is hereby referenced in its entirety. The County Work Plan, dated February 4, 2015, is incorporated into the City's Work Plan and Comprehensive Plan through Policy 6A.6.1. The intent of the County Work Plan is to meet the statutory requirements mentioned in subsection 1.2 of this plan and to coordinate the WASD's water supply initiatives with the SFWMD's *Lower East Coast Water Supply Plan Update*.

The WASD's service area is all portions of Miami-Dade County within the Urban Development Boundary (UDB), excluding all or portions of North Miami, Aventura, Sunny Isles Beach, Biscayne Park, Miami Gardens, Homestead and Florida City. The areas within the Urban Expansion are included in the planning horizon after 2015. The following summarizes Miami-Dade County's Work Plan:

- Description of population and water demand projections (Exhibit C-7 and C-8) Water Supply Service Area, Retail and Wholesale Customers, respectively, by Municipality provides municipal population projections and projected AADF "Annual Average Daily Flow" finished water based on 126.82 gallons per capita per day (gpcd) reported for the City of Doral. This represents a decrease of 28.18 gpcd or 22.2 percent, in comparison, to the 155 gpcd reported in 2009. The population information was derived from Miami-Dade County Department of Planning and Zoning Transportation Analysis Zone (TAZ), November 2014 population data. Sections 3.7 and 3.8 of the report provide a brief discussion of WASD's conservation and reuse programs.)
- The Water Supply Facilities Work Plan details the facilities and proposed alternative water supply (AWS) projects that are planned in order to meet the water demands through 2033. These projects are expected to be completed in increments consistent with the projected growth set forth in the Plan. The AWS projects and annual average daily demand (AADD) assumes that all current wholesalers will remain in the WASD system through 2033. The AWS projects are included in Appendix B of the County's Work Plan, in the County's Adopted FY 2014-2020 Capital Budget and Multi-Year Capital Plan.

In the 20-Year Work Plan, WASD is committed to meet the water demand for all municipalities within the service area. The City of Doral is primarily served by the J.E. Preston Water Treatment Plant. Along with the Hialeah Water Treatment Plant these plants are interconnected and act as a single system. The plants operate under a Title V Florida Department of Environmental Protection permit number 0250281-0005-AV. Both of these treatment facilities obtain raw water from the Biscayne Aquifer under consumptive use permit number 13-00017-W and utilize the same basic process for water treatment. The treatment process includes lime softening, chlorination, ammonization, fluoride, filtration and air striping. In addition to these plants, Miami-Dade WASD also operates the Alexander Orr, Jr. Water Treatment Plant and five small water treatment plants servicing the southern portion of the County. The Alexander Orr, Jr. plant utilizes the same water treatment process as the Hialeah and Preston plants with the exception of the air striping. Figure 4 identifies the location of the three main treatment plants and their corresponding service areas. The following details WASDs' four main water treatment facilities.

3.6.1 Water Treatment Plants

The Hialeah Water Treatment Plant is located at 700 West 2nd Avenue, Hialeah, Florida and was originally constructed in 1924, with upgrades in 1935, 1946 and 1991. This facility has a maximum installed design capacity of 60.0 million gallons per day. The

treatment process includes lime softing with sodium silicate activated by chlorine, recarbonation, chlorination, ammonization, fluoridation, filtration, and air stripping. There are plans to rerate and upgrade this plant to a capacity of 70.0 MGD, if necessary.

The John E. Preston Water Treatment Plant is located at 1100 West 2nd Avenue, Hialeah, Florida and was originally designed as a 60 mgd plant in 1968, with upgrades in 1980 (upgraded to 110 mgd), 1988 and 1991. In 1991, the plant was modified with an air stripping capacity of 185 mgd to remove VOCs. In 2005, the plant process modifications to provide enhanced softening for reduction of color and total organic carbon came on line. The current rated capacity is 165 mgd with a treatment process similar to Hialeah WTP.

The Hialeah Reverse Osmosis (RO) Water Treatment Plant was released for operation by the Florida Department of Environmental Protection (FDEP) in November 2013. The design, construction and operation of this plant is part of a Joint Participation Agreement (JPA) between the City of Hialeah and Miami Dade County. The plant is approved to operate at a capacity of 7.5 mgd. An additional 2.5 mgd is scheduled to be completed by December 2015. The main source of water for the Hialeah RO WTP is the Floridan Aquifer. Currently, this plant serves the City of Hialeah and unincorporated areas within WASD's service area. This plant is located at 4250 W. 114th Terrace.

The Alexander Orr, Jr. Water Treatment Plant is located at 6800 SW 87th Avenue, Miami, Florida and was originally constructed in 1954. There have been a number of expansions in the last 50 years. This facility has a maximum installed design capacity of 256.0 MGD with a rated capacity of 214.74 MGD. This plant receives its source water from the Alexander Orr, Jr. Wellfield, Snapper Creek Wellfield, Southwest Wellfield, and the West Wellfield. This plant treatment process is very similar to the process used by Hialeah and John E. Preston Water Treatment Plants.

3.6.2 Public Potable Water Wells

The City of Doral has no private potable water facilities. But, wellfields and their Cones of Influence providing raw water to the WASD water treatment plants are located in or proximate to the City (Figure 5.). These wellfields consist of 45 individual wells and have a total designed installed capacity of approximately 295 MGD. Of these wells, 23 provide raw water to the Hialeah Plant while the remaining 22 wells service the J.E. Preston Plant. To protect the quality of the groundwater in the area, the City of Doral has adopted the Miami-Dade County Wellfield Protection Program, which restricts the types of land uses allowed within the area of the wellfield cone of influences. The following are some of the restrictions associated with the Wellfield Protection Program:

- Only uses that do not generate hazardous waste are allowed within the Cone of Influence as identified in Figure 5;

- All permitted uses within the Cone of Influence shall be required to connect to the WASD central sewer collection system;

- Developments within the Cone of Influence shall be required to meet the minimum requirements for percentages of pervious area; and,

- Land uses within the Cone of Influence shall be restricted to those uses that do not create water pollution.

3.6.3 Finished Water Storage Facilities

The Hialeah-Preston Finished Water Storage Facilities combine reservoir ground storage, clearwells, ground and elevated storage tanks to provide a total of 56.0 MG of storage.

3.7 Conservation

The City has implemented its Water Efficiency Use Plan through Ordinance 08-14, which adopted new water efficiency standards for new residential, commercial and industrial development and allows for sub-metering in multi-family residential developments. The requirements set forth in the Ordinance became effective July 1, 2009. Miami-Dade WASD implements all Best Management Practices included in the Water Efficiency Use Plan in addition to various irrigation, Florida Friendly Landscaping, and plumbing fixture efficiency ordinances and some wastewater reuse.

3.7.1 Local Government Specific Actions, Programs, Regulations or Opportunities

<u>The Miami-Dade Water Use Efficiency Plan</u>

In April 2006, the Miami-Dade County Board of County Commissioners adopted the Miami-Dade Water Use Efficiency Plan through Resolution No. R-468. This plan was implemented based on the FDEP Conserve Florida Guide. The intent of this plan is to implement Best Management Practices (BMPs) to improve the management of traditional water supplies while encouraging the development of alternative water supplies and improving the efficiency of our current water use. Several initiatives were adopted by WASD to encourage efficient use of water by residential and non-residential users. Some of these initiative included plumbing retrofits, landscape irrigation evaluations, and residential and commercial water use evaluations and rebates.

To ensure future water savings, the Water Use Efficiency Standards for new residential and commercial developments, which were enacted by the Miami-Dade Board of County Commissioners on January 1, 2009, are being implemented through local building codes. The standards included technical amendments to the Building Code to require maximum water conservation flow rates for plumbing fixtures.

In 2012, the projected water savings exceeded projections, with an annual savings of more than 1.6 MGD. In addition, as a result of the implementation of the BMPs, and the landscape irrigation restriction measures, Miami-Dade County has continued to see a lower than expected per capita water consumption. The City has also experience a 22.2 percent decrease in the amount of finished water used on a per capita per day basis since 2009. This is due to a combination of water conservation measures

established by the City, introduction of water efficient features in new developments, and the water conservation educational programs established by WASD and the District.
(Comprehensive Plan- Objectives 5A.3, 5A.5, 6.1. Policies 1.5.1, 1.5.3, 1.5.8, 5A.1.3, 5A.1.4, 5A.3.2, 6.1.1)

Water Conservation Plans and Development Codes

The County adopted a Water Conservation Plan to its Water Use Efficiency Section as mandated by County Ordinance 06-177, Section 32-83.1 of the Miami-Dade County Code. The Plan identifies BMPs for the service area.

In addition, Miami-Dade County has developed recommendations for new development that would achieve higher water use savings than currently required by code. The recommendations were developed by an Advisory Committee and were presented to the Board of County Commissioners (BCC) on June 5, 2007. These water conservation recommendations were adopted by Ordinance 08-14 on February 5, 2008. Said Ordinance was amended in September 2008 to clarify certain standards for plumbing fixtures and changed the effective date to January 1, 2009. These water efficiency recommendations represent an additional 30 percent to the water savings identified in the 20-year Water Use Efficiency Plan. The list of recommendations submitted to the Board of County Commissioners and the ordinance relating to water use efficiency standard are presented in WASD 20-Year Water Supply Facilities Work Plan provided in Appendix A, and posted in the Miami-Dade Water Conservation Portal.
(Comprehensive Plan – Objectives: 1.3. Policies: 1.5.1, 1.5.3, 5A.3.2, 6.1.1)

Restrictions on Permitted Water Use

In 2007, the City of Doral adopted Ordinance No. 2007-13 entitled “Water Restrictions” to protect the water resources of the City from harmful effects of over-utilization during periods of water shortage and assist the District implementation of its water shortage plan. The provisions in this ordinance applies to all persons using the water resources of the City which are subject to the “water shortage” or “water shortage emergency” as determined by the District, whether from public or privately owned water utility system, private wells, or private connections with surface water bodies. This article excludes entities or person using treated effluent or saltwater.

This Ordinance includes requirements for restrictions on water use during times an “emergency situation” is declared by the District or when the City Council determines a reduction in water consumption is necessary to alleviate a local water shortage within WASD water system. Water restrictions may include reduction of hours and days allowed for irrigation, washing of vehicles, washing outdoor surfaces, operation of ornamental fountains, operation of air conditioning without a recirculation system, limitations on filling and use of swimming pools, limitations on escapement of water through defective plumbing, restrictions on hotels and restaurants as to the minimum amount of water necessary to conduct operations and other restrictions as necessary.
(Comprehensive Plan - Objectives: 1.3, 1.5, 5A.3, 5A.5. Policies: 1.5.3, 1.5.4, 1.8.7, 5A.5.1, 6.1.4, 6.1.7)

Use of Florida-Friendly Landscape Principles

The City of Doral Comprehensive Plan and Land Development Code recommends use of Florida-Friendly landscape materials and the minimum percent of required pervious area that must follow the principles of Florida Friendly Landscape provisions as set forth in the South Florida Water Management District's Xeriscape Plant Guide II.
(Comprehensive Plan - Objective: 5A.5. Policies 1.4.2, 1.4.3, 1.8.6, 1.10.7, 5A.3.2, 6.1.4, 6.1.6)

Requirement of Ultra-Low Volume Plumbing in New Construction

The City of Doral has adopted the Florida Building Code (FBC) which contains plumbing flow restriction requirements. The County Code prohibits the cities within its jurisdiction from enacting standards less stringent from the FBC. The City of Doral Building and Inspection Services also includes in their procedures provisions for new construction to have water conservation control devices installed per the Florida Plumbing Code, as a condition for granting certificates of occupancy.
(Comprehensive Plan – Policy 6.1.6)

Water Conservation Based Rate Structure

The water conservation based rate structure is provided by WASD. The City of Doral does not provide water and sewer services.

Meter Replacement Program

Meter replacement program is the responsibility of WASD.

Rain Sensor Overrides for New Lawn Sprinkler

The City of Doral has adopted the FBC, which requires the installation of rain sensors on new irrigation systems. Additionally, the City of Doral abides by all of the County's landscape Code requirements regarding rain sensors on automatic lawn sprinklers systems.
(Comprehensive Plan – Policy 1.5.4)

Public Information Program

This program provides water conservation information and practices to the City's residents and customers through the City's webpage and WASD and the District publications. The City has a group of professionals with in-depth knowledge of water resources that are available to local schools and community groups who are interested in promoting water conservation and management initiatives. The City also supports and promotes "Green" events through the local schools or community groups.

The City will coordinate future water conservation efforts with WASD and the District. In addition, the City will continue to support and expand existing goals, objectives and policies in the comprehensive plan promoting water conservation in a cost-effective and environmentally sensitive manner. The City will continue to actively support the District and its water supplier(s) in the implementation of new regulations or programs designed to conserve water during the dry season.

(Comprehensive Plan - Objectives: 1.8, 1.10. Policies: 1.8.1, 1.8.3, 1.8.4, 1.8.5, 1.8.6, 1.8.7, 1.8.8, 5A.3.1, 5A.5.2, 6.1.8, 6.3.5,)

Per Capita Consumption

WASD will establish per capita consumption for all municipalities including the City of Doral and the other retail customers. Based on this data, the WASD will work with the municipalities to address those with higher than average per capita and will target programs for those areas. The implementation of the BMPs identified in the 20-year Water Use Efficiency Plan has resulted in a decrease in water consumption system wide from 158 to 136.9 gallons per person per day (www.miamidade.gov/waterconservationplans-initiatives.asp#0)

3.7.2 Identify any Local Financial Responsibilities as Detailed in the CIE and CIS

The City of Doral has not identified any financial responsibilities related to the collection, storage, or distribution of potable water, including conservation.

3.8 Reuse

Reclaimed water is currently not available to the City from Miami-Dade WASD. The City does not currently promote the use of reclaimed wastewater for irrigation purposes since it is not available. But, if reclaimed wastewater irrigation does become available the City will coordinate with MDWASD to promote its use.

For the past number of years, Florida's utilities, local governments, and water management districts have led the nation in implementing water reuse programs that increase the quantity of reclaimed water used and public acceptance of reuse programs. Section 373.250(1) F.S. provides that "water reuse programs designed and operated in compliance with Florida's rules governing reuse are deemed protective of public health and environmental quality." In addition, Section 403.064(1), F.S., provides that "reuse is a critical component of meeting the state existing and future water supply needs while sustaining natural systems."

The County has committed to generate a total of 117.5 mgd of reuse water, including 27.6 mgd of reclaimed water that will be used to recharge the Floridan Aquifer. In the 20-Year Work Plan, the County identified a number of water reuse projects and their respective schedules. In 2014, the total existing permitted projects (North District WWTP, Central District WWTP, and South District WWTP) are generating 16.49 mgd of reuse water. Most of the reuse water is used for industrial and non-public access irrigation. The remaining projects (new projects – South District WWTP (9.2 mgd), Central District WWTP (9.2 mgd), West District Water Reclamation Plant (9.2 mgd) and South District WWTP (90 mgd) are expected to generate a total of 117.5 mgd of reuse water. The reuse water generated by the first three projects will be used to recharge the Floridan Aquifer. The scope of these projects is part of the Ocean Outfall legislation implementation plan submitted to the Secretary of FDEP, on June 28, 2013. The final project (South District WWTP) which is expected to generate 90 mgd will be use to cool units 5, 6 &7 at Turkeypoint. The estimated completion date for these projects is

December 31, 2025. A copy of WASD Reuse Projects and Respective Schedule is provided in Appendix E.

3.8.1 Local Government Specific Actions, Programs, Regulations, or Opportunities

The City of Doral supports water reuse initiatives under consideration by both the District and Miami-Dade County. The City also supports WASD's water reuse initiatives and the implementation of new regulations or programs that are cost-effective and environmentally sustainable, which are designed to increase the volume of reclaimed water use and public acceptance of reclaimed water. The City further supports Miami-Dade County's efforts to implement a total of 117.5 mgd of reuse in accordance with the County 20-Year Water Use Permit.

The City coordinates water conservation efforts with WASD to ensure that proper techniques are applied. In addition, the City continues to support and expand existing goals, objectives and policies in the comprehensive plan that promotes water conservation in a cost-effective and environmentally sensitive manner. The City will continue to actively support the SFWMD and Miami-Dade County in the implementation of new regulations or programs that are designed to conserve water during the dry season. In 2014, the City adopted a series of development conditions designed to promote water conservation, development of natural retention areas for storm water, and implementation of the County's Water-Use Efficiency Standards. The City also adopted Ordinance 2007-13 (Appendix F) to require compliance with the previsions of the MDWASD Water Efficiency Standards Manual for new, residential, commercial and industrial developments.

3.8.2 Identify any Local Financial Responsibilities as Detailed in the CIE and CIS

The City of Doral has not identified any financial responsibilities related to the collection, storage, or distribution of potable water, including reuse.

4.0 CAPITAL IMPROVEMENTS

4.1 Capital Improvements Schedule

The Miami-Dade County Schedule of Capital Improvements for Sewer Facilities and Water Facilities is provided in Appendix B of the County Work Plan, in the County's Adopted FY 2014-2020 Capital Budget and Multi-Year Capital Plan. The purpose of the schedule of capital improvements is to upgrade and improve the system, renovation and upgrades to existing facilities, wellfield improvements, automation of water treatment plants, land acquisition, system extension, pump station improvements, and engineering studies.

4.2 Funding

The costs of operating, maintaining, and improving the water and sewers systems are offset by water and sewers rates, bonds and government grants. The volume of water sold to customers is measured by water meters that are installed at each customer's

address. The System is an enterprise fund of the County, separate from all other funds of the County. This fund includes both the water system and the wastewater system. The rates that are charged to customers are reviewed annually and adjusted as needed in order to provide sufficient revenues to offset the administrative, operation and maintenance, debt service and other expenses set forth in the Miami-Dade County Water and Sewer Department's annual budget.

5.0 GOALS, OBJECTIVES AND POLICIES

There are several elements (Green, Infrastructure, Conservation and Capital Improvement) in the City of Doral Comprehensive Plan that directly addresses the water resources conservation and management. Table III provides an overview of the goals, objectives and policies in the Comprehensive Plan related to water conservation and management. As part of the update of the City's Water and Sewer Facilities Work Plan, the City will revise and add new objectives and policies to the Comprehensive Plan to ensure consistency with Miami-Dade Water and Sewer Department 20-Year Water Supply Facilities Work Plan and the District's *Lower East Coast Water Supply Plan Update* Regional Water Supply Plan, adopted on September 12, 2013. Table 3 provides an overview of the Comprehensive Plan objectives and policies associated with the implementation of water management measurements to protect the city and regional water resources.

The following GOPs have been adopted in the original Work Plan and have been reviewed to see if updates are revisions are needed:

a. Coordination of land uses and future land use changes with the availability of water supplies and water supply facilities;
b. Revision of potable water level of service standards for residential and non-residential users;
c. Provision for the protection of water quality in the traditional and new alternative water supply sources;
d. Revision of priorities for the replacement of facilities, correction of existing water supply and facility deficiencies, and provision for future water supply and facility needs;
e. Provision for conserving potable water resources, including the implementation of reuse programs and potable water conservation strategies and techniques;
f. Provisions for improved or additional coordination between a water supply provider and the recipient local government concerning the sharing and updating of information to meet ongoing water supply needs;
g. Coordination between local governments and the water supply provider in the implementation of alternative water supply projects, establishment of level of service standards and resource allocations, changes in service areas, and potential for annexation;

Table III
City of Doral
Water Supply Facilities Work Plan -2015
City of Doral Comprehensive Plan
Water Resources Goals, Objectives and Policies

Item	Element	Goals (G), Objectives (O) or Policies (P)	Description	Comprehensive Plan Text Amendment	Water Conservation	Water Reuse	Water Management	Climate Change	Regulatory Compliance
1	Green Element	Objective 1.5	Achieve significant annual reductions in the average potable water usage by residents, visitors and businesses, and steady improvement in the water quality of Doral's surface water bodies.		√		√	√	
2	Green Element	Policy 1.5.1	Implement the recommendations of the City's 10-Year Water Supply Facilities Work Plan adopted in 2010 and use its long-range conservation strategies as the basis to reduce water usage citywide by 25% to 150 gallons per capita per day or lower by 2017	Implement the recommendations of the City's 20 ~~10~~-Year Water Supply Facilities Work Plan adopted in 2015 ~~2010~~ and use its long-range conservation strategies as the basis to reduce water usage citywide by 16% ~~25%~~ to 126.82 ~~150~~ gallons per capita per day or lower by 2025 ~~2017~~	√		√	√	√
3	Green Element	Policy 1.5.5	Work with the MD Water and Sewer Department to examine opportunities within Doral to utilize reclaimed water on area golf courses, parks and medians, and if feasible, identify an initial public demonstration.	Work with ~~the MD~~ Miami-Dade County Water and Sewer Department to examine opportunities within Doral to utilize reclaimed water on area golf courses, parks and medians, and if feasible, identify an initial public demonstration by no later than 2020.	√	√	√	√	
4	Green Element	Policy 1.8.7	Give residents and businesses multiple easily-accessible venues to learn about feasible water conserving techniques and concepts. Encourage them to take advantage of regional and county water conservation programs including Residential Plumbing Fixtures Kit, Shower Head Exchange and other similar programs.		√				
5	Infrastructure Element	Goal 5A	Provide potable water facilities that meet the City's demands in a manner that promotes the public health, sanitation, environmental protection, and operational efficiency.		√		√		√
6	Infrastructure Element	Objective 5A.1	Continue to coordinate with Miami-Dade County Water and Sewer Department (WASD) to provide potable water facilities to meet the existing and projected demands based on level of service (LOS) standards consistent with State Statues and implement procedures to ensure that any future potable facility deficiencies are corrected. Evaluation Measure: LOS for potable water facilities and provision of adequate facilities prior to development.				√		√
7	Infrastructure Element	Policy 5A.1.1	The level of service standard for potable water is as follows: • Regional Treatment. The regional treatment system shall operate with a rated capacity no less than two percent above the maximum daily flow for the preceding year. • User LOS. The system shall maintain the capacity to produce and deliver 200 gallons per capita per day. • Water Quality. Water quality shall meet all federal, state, and county standards for potable water.	The level of service standard for potable water is as follows: • Regional Treatment. The regional treatment system shall operate with a rated capacity no less than two percent above the maximum daily flow for the preceding year. • User LOS. The system shall maintain the capacity to produce and deliver 126.82 ~~200~~ gallons per capita per day. • Water Quality. Water quality shall meet all federal, state, and county standards for potable water.	√		√		√
8	Infrastructure Element	Objective 5A.3	Coordinate with Miami-Dade County and South Florida Water Management District to implement comprehensive water conservation measures citywide to ensure that a sufficient supply of water is available to meet current and future demand for portable water. Evaluation Measure: Implementation of water conservation requirements and public educational programs.		√	√	√	√	
9	Infrastructure Element	Policy 5A.3.1	Promote public information programs sponsored by the South Florida Water Management District (SFWMD) in an effort to increase public awareness and acceptance of water conservation techniques through newsletters, public service announcements, and displays at public awareness events.		√		√		
10	Infrastructure Element	Policy 5A.3.2	By September 2006, review existing water conservation regulations and revise the land development code as necessary to ensure implementation of water conservation techniques, including: a) Subsurface and other water conserving irrigation techniques; b) Xeriscape techniques; c) Lawn watering restrictions; d) The use of low water use plumbing fixtures in all construction; and e) Any other effective methods commonly in practice or required by law.	By September 2018 ~~2006~~, review existing water conservation regulations and revise the land development code as necessary to ensure implementation of water conservation techniques, including: a) Subsurface and other water conserving irrigation techniques; b) Florida Friendly Landscaping and Xeriscape techniques; c) Lawn watering restrictions; d) The use of low water use plumbing fixtures in all construction; and e) Any other effective methods commonly in practice or required by law.	√		√		

City of Doral
Water Supply Facilities Work Plan -2015
City of Doral Comprehensive Plan
Water Resources Goals, Objectives and Policies

Item	Element	Goals (G), Objectives (O) or Policies (P)	Description	Comprehensive Plan Text Amendment	Water Conservation	Water Reuse	Water Management	Climate Change	Regulatory Compliance
11	Infrastructure Element	Objective 5A.4	To protect the potable water supplies and sources, regulate land use and development to protect the functions of natural drainage features and natural groundwater aquifer recharge. Evaluation Measure: Implementation and enforcement of land development regulations to protect the functions of natural drainage features and natural groundwater aquifer recharge.		√			√	√
12	Infrastructure Element	Policy 5A.4.1	Coordinate with the Miami-Dade County WASD and South Florida Water Management District (SFWMD) in determining and assessing impacts of proposed developments on the County's potable water supply.		√				
13	Infrastructure Element	Objective 5A.5	To promote the increased conservation and reuse of water, development plans shall be reviewed for inclusion of native vegetation, low water demand landscaped material, and water reuse opportunities in order to reduce outdoor water consumption. Evaluation Measure: Number of developments approved with native vegetation, low water demand landscape material, and water reuse plans.		√	√	√	√	
14	Infrastructure Element	Policy 5A.5.1	Coordinate with Miami-Dade County and SFWMD to implement water restrictions.		√		√		√
15	Infrastructure Element	Objective 6A.6	New Objective - Potable Water Supply Planning	Potable Water Supply Planning. The City f Doral shall comply with its 20-year Water Supply Facilities Work Plan (Work Plan) adopted on April 15, 2015 as required by Sec. 163.3177(6)(c), F.S. The South Florida Water Management District governing board approved its Lower East Coast Water Supply Plan Update on September 12, 2013. The City's Work Plan will be updated, at a minimum every 5 years within 18 months after South Florida Water Management District's approval of an updated Lower East Coast Regional Water Supply Plan.					
	Infrastructure Element	Policy 6A.6.1	New Policy	The City's Work Plan is designed to assess current and projected portable water demands, evaluate the sources and capacities of available water supplies; and identify those water supply projects, using all available technologies, necessary to meet the City's water demands.	√		√		√
16	Infrastructure Element	Policy 6A.6.2	New Policy	Comply with the City's 20-Year Work Plan and incorporate the Miami-Dade County 20-Year Water Supply Facilities Work Plan adopted on February 4, 2015 by reference into the City of Doral Comprehensive Plan.	√		√		√
17	Infrastructure Element	Policy 6A.6.3	New Policy	Coordinate appropriate elements of the Comprehensive Plan with the South Florida Water Management District's Regional Water Supply Plan adopted September 12, 2013 and with the Miami-Dade County 20-Year Water Supply Facilities Work Plan adopted February 4, 2015. The City shall amend its Comprehensive Plan and Work Plan as required to provide consistency with the District and Miami-Dade County Water Supply Facilities Work Plans.	√		√		√
18	Infrastructure Element	Policy 5C.1.11	All appropriate state, water management district, Miami-Dade County and/or federal permits required by a development shall be obtained and submitted to the City prior to the issuance of construction permits.		√				√
19	Infrastructure Element	Objective 5E.1	Protect surface waters from degradation consistent with federal, state, and South Florida Water Management District (SFWMD) standards and maintain them in conditions that conserve their natural functions. Evaluation Measure: Water quality standards for surface water.		√		√		√
20	Infrastructure Element	Policy 5E.1.1	Coordinate with representatives of the Miami-Dade County Department of Environmental Resource Management (DERM) and SFWMD to determine whether any areas of the City could be considered as potential groundwater recharge areas.				√		√
21	Infrastructure Element	Policy 5E.1.2	The natural hydrologic character of surface waters shall be maintained consistent with federal, state, Miami-Dade County and SFWMD standards. The natural character of surface waters, including sheet flows such as those found in floodways and those that connect wetlands with other wetlands and surface waters, shall be protected.				√	√	√

City of Doral
Water Supply Facilities Work Plan -2015
City of Doral Comprehensive Plan
Water Resources Goals, Objectives and Policies

Item	Element	Goals (G), Objectives (O) or Policies (P)	Description	Comprehensive Plan Text Amendment	Water Conservation	Water Reuse	Water Management	Climate Change	Regulatory Compliance
22	Infrastructure Element	Objective 5E.2	Protect groundwater resources consistent with federal, state, Miami-Dade County and SFWMD standards so that the quality of groundwater is not degraded such that the health, safety, and welfare of the public is threatened, or such that the viability and functional values of other natural resources are threatened. Evaluation Measure: Adoption of growth management policies to protect water quality and groundwater resources.				√		√
23	Infrastructure Element	Policy 5E.2.1	In cooperation with SFWMD and Miami-Dade County, evaluate current and projected water demands and sources for the ten-year period based on the demands for industrial, agricultural, and potable water and the quality and quantity of water available to meet these demands.	In cooperation with SFWMD and Miami-Dade County, evaluate current and projected water demands and sources for the twenty ~~ten~~ year period based on the demands for industrial, agricultural, and potable water and the quality and quantity of water available to meet these demands.			√		
24	Infrastructure Element	Policy 5E.2.6	All development located within the High Aquifer Recharge Area shall ensure that post-development water runoff rate and/or volume and water quality does not exceed pre-development runoff rate and/or volume and water quality.		√		√		√
25	Conservation Element	Objective 6.1	Conserve portable water as a resource of the City and the region as a whole in order to reduce per capita water demand and better meet present and projected needs of all consumers. Evaluation Measure #1: Annual record of per capita water demand. Evaluation Measure #2: Number of City-supported water conservation programs.		√		√		
26	Conservation Element	Policy 6.1.1	Continue to enforce all federal, state, and regional, and county water quality standards in the City.				√		√
27	Conservation Element	Policy 6.1.2	Annually communicate the projected population and non-residential growth to the Miami-Dade Water and Sewer Department (WASD) to ensure long term demand is reflected in WASD's water supply reports and permits with the South Florida Water Management District (SFWMD) and other Federal and State agencies.				√		
28	Conservation Element	Policy 6.1.4	Coordinate with Miami-Dade County WASD and the SFWMD to implement emergency water conservation measures when necessary.		√		√		√
29	Conservation Element	Policy 6.1.7	Consider implementation of a leak detection program that would identify users with unaccounted for water loss greater than 10 percent		√		√		
30	Conservation Element	Policy 6.1.8	By January 2007, ensure that water conservation booklets and brochures produced by the SFWMD and other environmental agencies are readily available at City Hall and other public facilities to residents and businesses.		√		√		
31	Conservation Element	Policy 6.4.16	New Climate Change Policy	Coordinate with Miami-Dade County WASD to develop strategies to improve the resiliency of existing water resources in order to protect future water quality and minimize the potential for flood damage and water shortage.	√		√	√	
32	Intergovernmental Element	Policy 9.1.21	New Climate Change Policy	Coordinate with Miami-Dade County, South Florida Regional Planning Council, South Florida Water Management District and other governmental entities in the development of goals, objectives, and policies to address climate change in south Florida.	√		√	√	
33	Intergovernmental Element	Policy 9.1.22	New Climate Change Policy	Participate with the Southeast Florida Regional Climate Change Compact, neighboring municipalities and Miami-Dade County to make our community more climate change resilient through the adoption of strategies, policies and programs.	√		√	√	
34	Capital Improvement Element	Table 10.1	Recommended Level of Services (LOS) Standards for the City of Doral	Revise the User LOS - The system shall maintain the capacity to produce and deliver 126.82 ~~200~~ gallons per capita per day.			√		√

h. Coordination of land uses with available and projected fiscal resources and a financially feasible schedule of capital improvements for water supply and facility projects;
i. Additional revenue sources to fund water supply and facility projects;
j. Coordination with the respective regional water supply plan;
k. Update the Work Plan within 18 months following the approval of a regional water supply plan; and
l. Concurrency requiring water supplies at the building permit stage.

Concurrency Management System (City of Doral)

The City of Doral has established a Concurrency Management System (CMS) that insures the availability and sufficiency of public facilities and services at the time that the impacts of development occur and provides a program to prevent a reduction in the levels of service (LOS) below the adopted LOS standards. Furthermore it assures the proper timing, location and design of supportive urban service systems concurrent with the impacts of new development. The following benefits may also be realized with the adoption of a CMS:

- Support consistency of the Capital Improvements Element with the Future Land Use Element;
- Provide for the orderly and cost-effective expansion of public facilities;
- Supplement capital improvements expenditures and taxing structures for capital improvements; and
- Reduce the possibility of damage to the environment from the use of overburdened facilities.

The Concurrency Management System, which is incorporated in the Land Use Element and Capital Improvement Element, includes guidelines for interpreting and applying LOS standards to applications for development orders and development permits. It also establishes development review procedures in the City's Land Development Code that may make development approval contingent on the City's ability to provide facilities and services or may require that the developer provide facilities and services in order to maintain adopted LOS standards. Petitioners must supply public facility impact information with their development applications. City staff then reviews and verifies the project information, comparing it with public facility capacity data and anticipated committed development impacts to ensure that adopted LOS standards will be maintained if the development application is approved. If LOS will not be maintained, the petition is denied unless the applicant the applicant has presents revised plans demonstrating that the new development shall:

- Be serviced with all requisite public facilities concurrent with the impacts of development;
- Provide LOS for all requisite facilities which is compliant with the City's adopted LOS standards; and

- Shall not cause a reduction of levels of service for existing infrastructure below minimum adopted thresholds.

6.0 REGIONAL ISSUES IDENTIFIED IN REGIONAL WATER SUPPLY PLANS

A summary of the issues for each Regional Water Supply Plan can be found below. More detailed information can be found in the applicable Regional Water Supply Plan; a web link has been included for additional information.

6.1 Lower East Coast Water Supply Plan

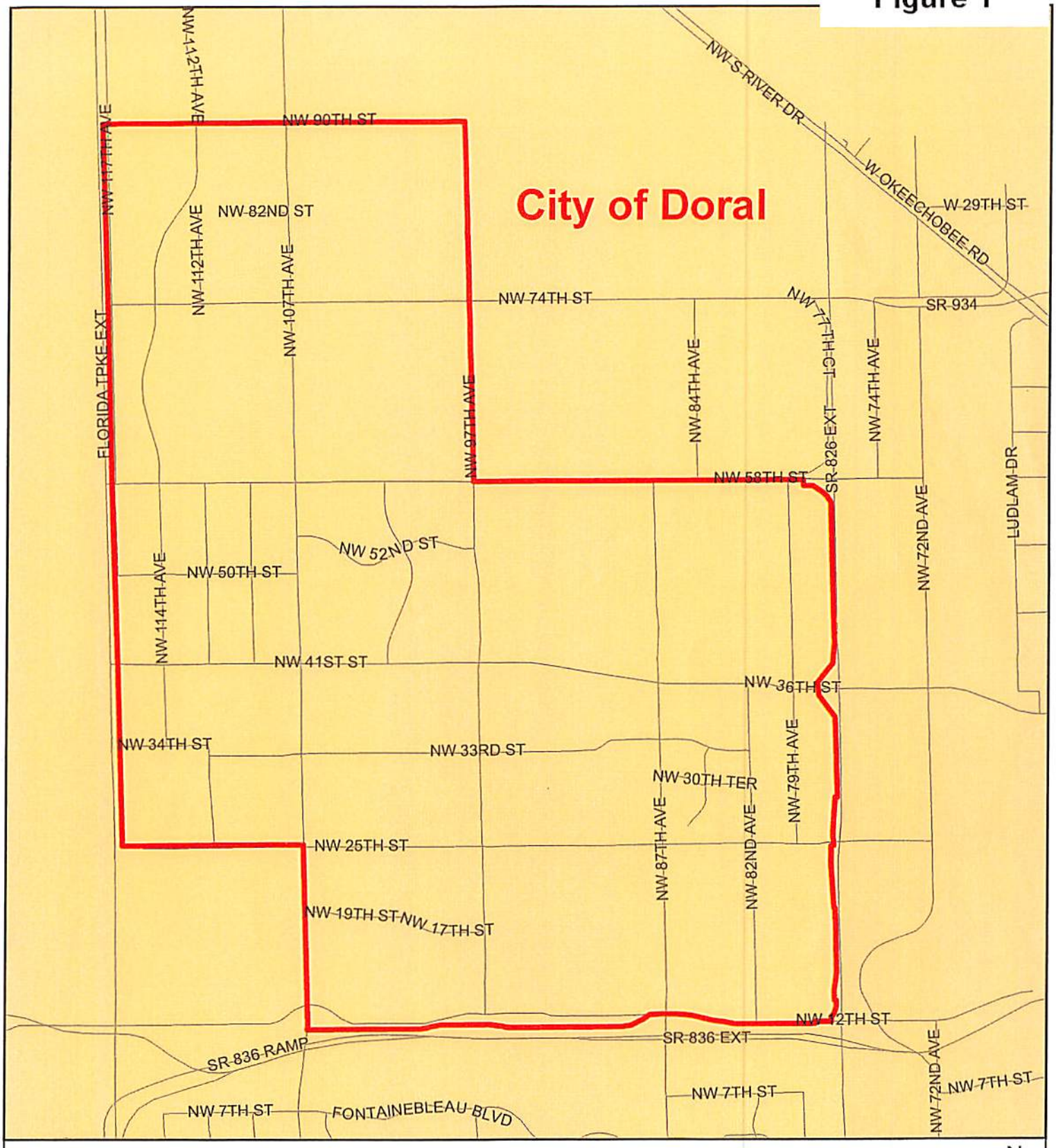
Detailed information on the regional issues can be found in Chapter 5, Evaluation of Water Source Options, in the Lower East Coast Water Supply Plan. The information can be accessed at:
http://www.sfwmd.gov/portal/page/portal/xweb%20-%20release%203%20water%20supply/lower%20east%20coast%20plan#wsp_docs

Briefly, the issues are:

1. Increased withdrawals from both the Surficial Aquifer System and surface water from Lake Okeechobee are limited.
2. Conservation continues to be relied upon to reduce per capita use and a means to potentially delay or perhaps avoid adding capacity.
3. Use of reclaimed water continues to be important alternative source in the region and helps to meet requirements of the 2008 Leah G. Schad Ocean Outfall Program.

FIGURES

Figure 1



General Location Map

Source: City of Doral

Figure 2

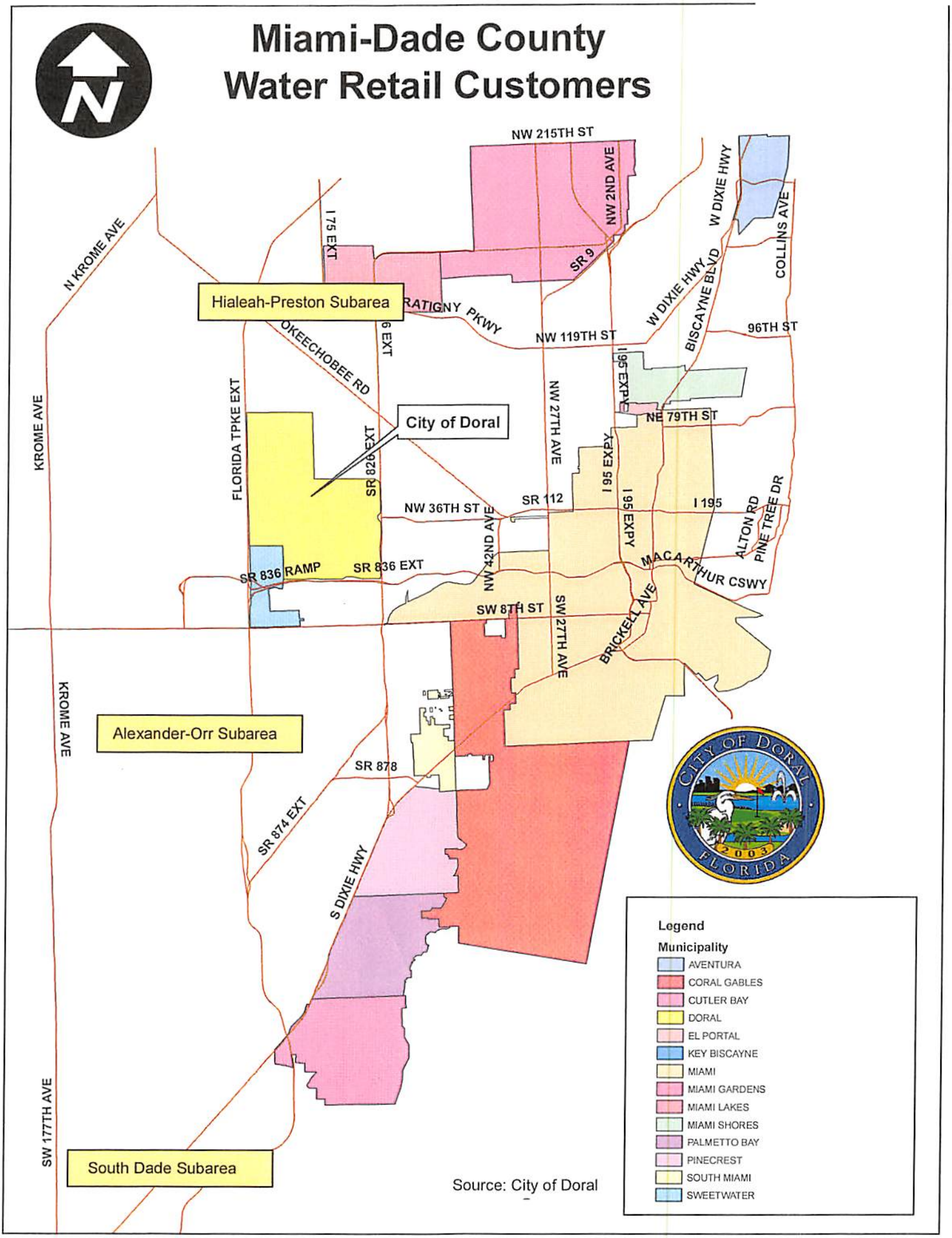
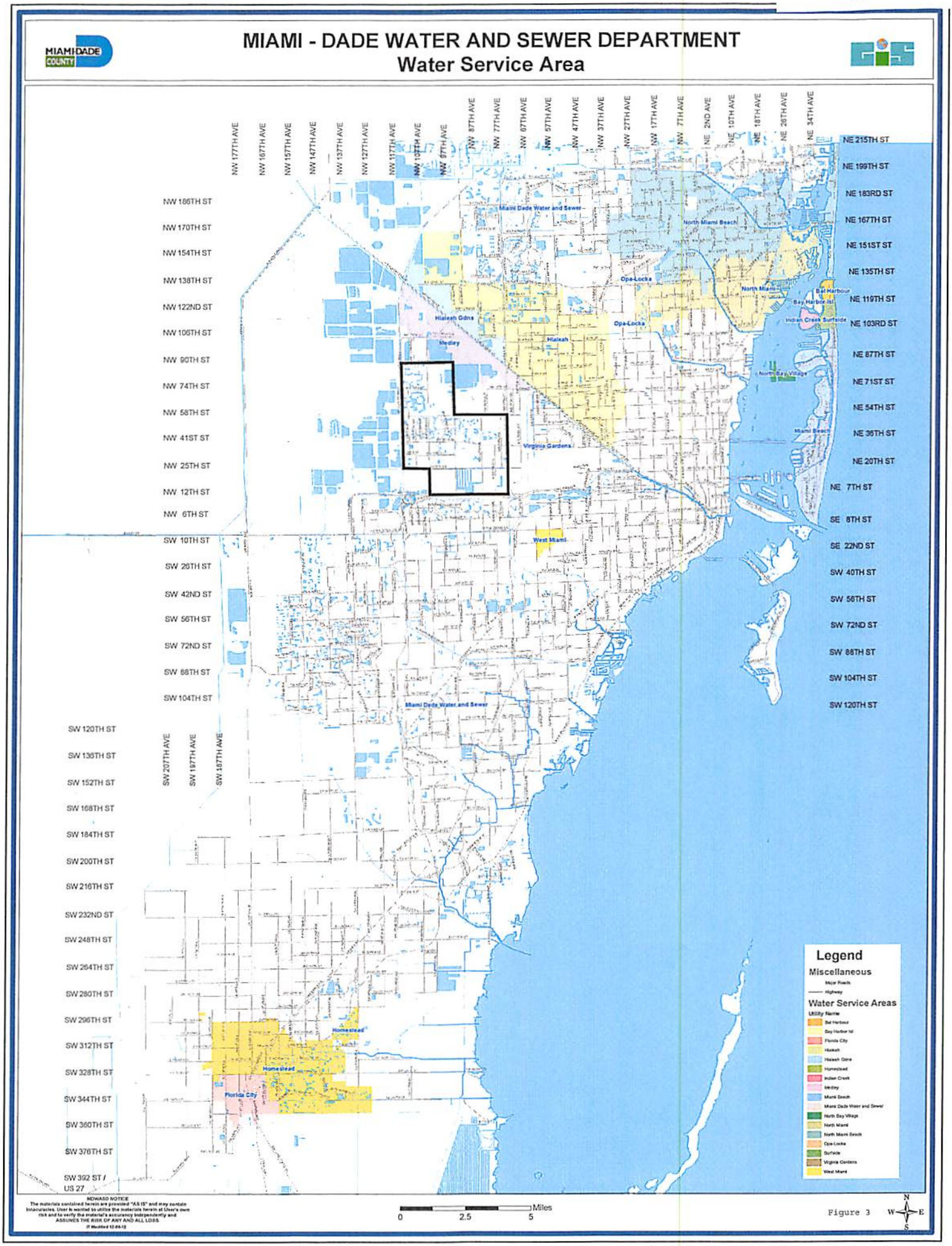

Miami-Dade County
Water Retail Customers
NW 215TH ST
NW 2ND AVE
W DIXIE HWY
COLLINS AVE
N KROME AVE
I 75 EXT
SR 9
Hialeah-Preston Subarea
RATIGNY PKWY
W DIXIE HWY
BISCAYNE BLVD
96TH ST
NW 119TH ST
OKEECHOBEE RD
6 EXT
I 95 EXPY
KROME AVE
FLORIDA TPKE EXT
City of Doral
NW 27TH AVE
NE 79TH ST
SR 826 EXT
I 95 EXPY
NW 36TH ST
SR 112
I 195
ALTON RD
PINE TREE DR
NW 42ND AVE
SR 836 RAMP
SR 836 EXT
MACARTHUR CSWY
SW 8TH ST
SW 27TH AVE
BRICKELL AVE
KROME AVE
Alexander-Orr Subarea
SR 878
SR 874 EXT
S DIXIE HWY
SW 177TH AVE
South Dade Subarea
CITY OF DORAL
2003
FLORIDA
Source: City of Doral
Legend
Municipality
AVENTURA
CORAL GABLES
CUTLER BAY
DORAL
EL PORTAL
KEY BISCAYNE
MIAMI
MIAMI GARDENS
MIAMI LAKES
MIAMI SHORES
PALMETTO BAY
PINECREST
SOUTH MIAMI
SWEETWATER

Figure 3


MIAMI - DADE WATER AND SEWER DEPARTMENT
Water Service Area
MIAMI-DADE COUNTY
NW 177TH AVE
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Miami Dade Water and Sewer
North Miami Beach
Opa-Locka
North Miami
Bal Harbour
Bay Harbor Isl
Indian Creek Surfside
Hialeah Gdns
Medley
Hialeah
North Bay Village
Miami Beach
Virginia Gardens
West Miami
Homestead
Florida City
Legend
Miscellaneous
Major Roads
Highway
Water Service Areas
Utility Name
Bal Harbour
Bay Harbor Isl
Florida City
Hialeah
Hialeah Gdns
Homestead
Indian Creek
Medley
Miami Beach
Miami Dade Water and Sewer
North Bay Village
North Miami
North Miami Beach
Opa-Locka
Surfside
Virginia Gardens
West Miami
MDWASD NOTICE
The materials contained herein are provided "AS IS" and may contain inaccuracies. User is warned to utilize the materials herein at User's own risk and to verify the material's accuracy independently and ASSUMES THE RISK OF ANY AND ALL LOSS
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Figure 4

MIAMI - DADE WATER AND SEWER DEPARTMENT
Water Service Area and Plants

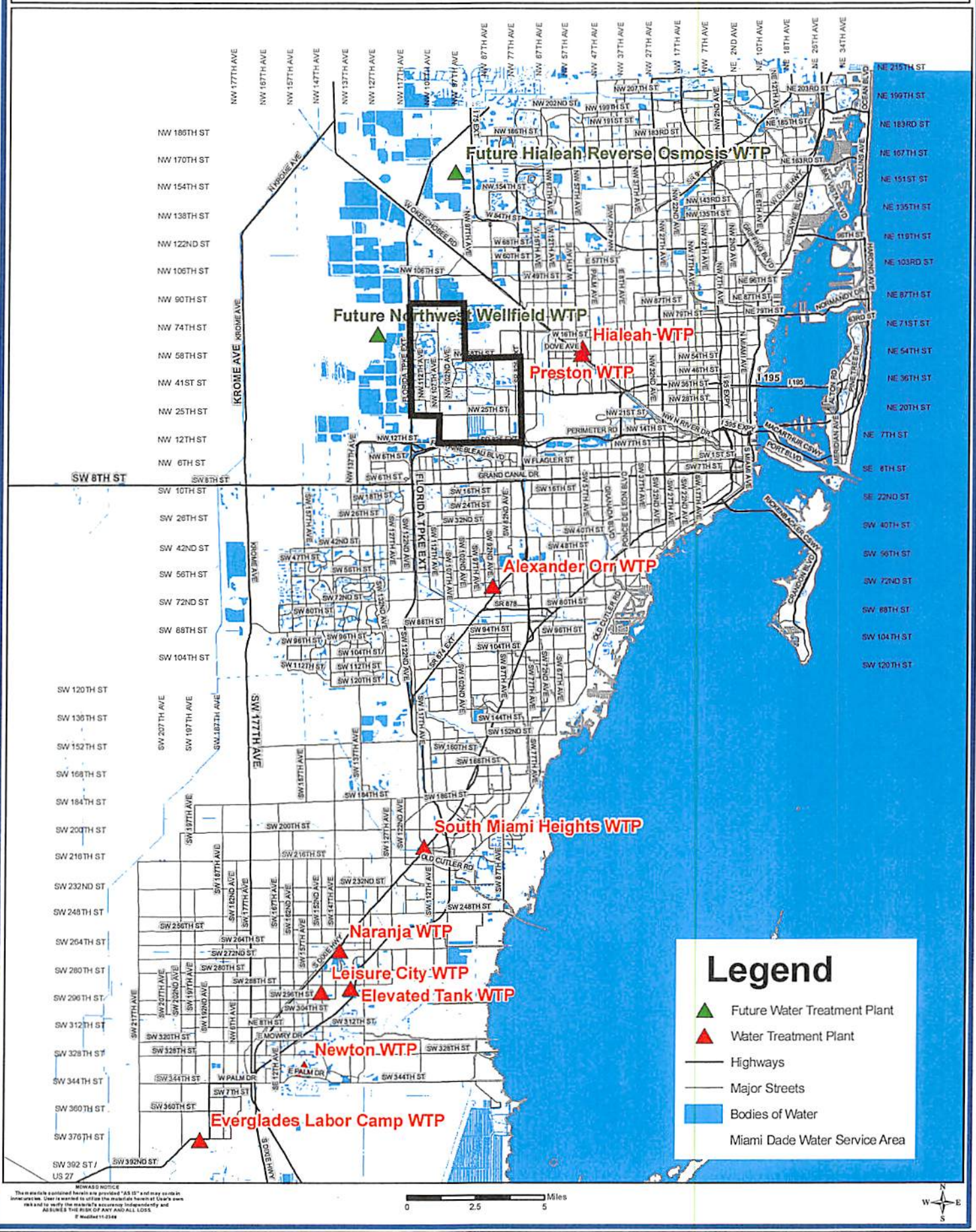
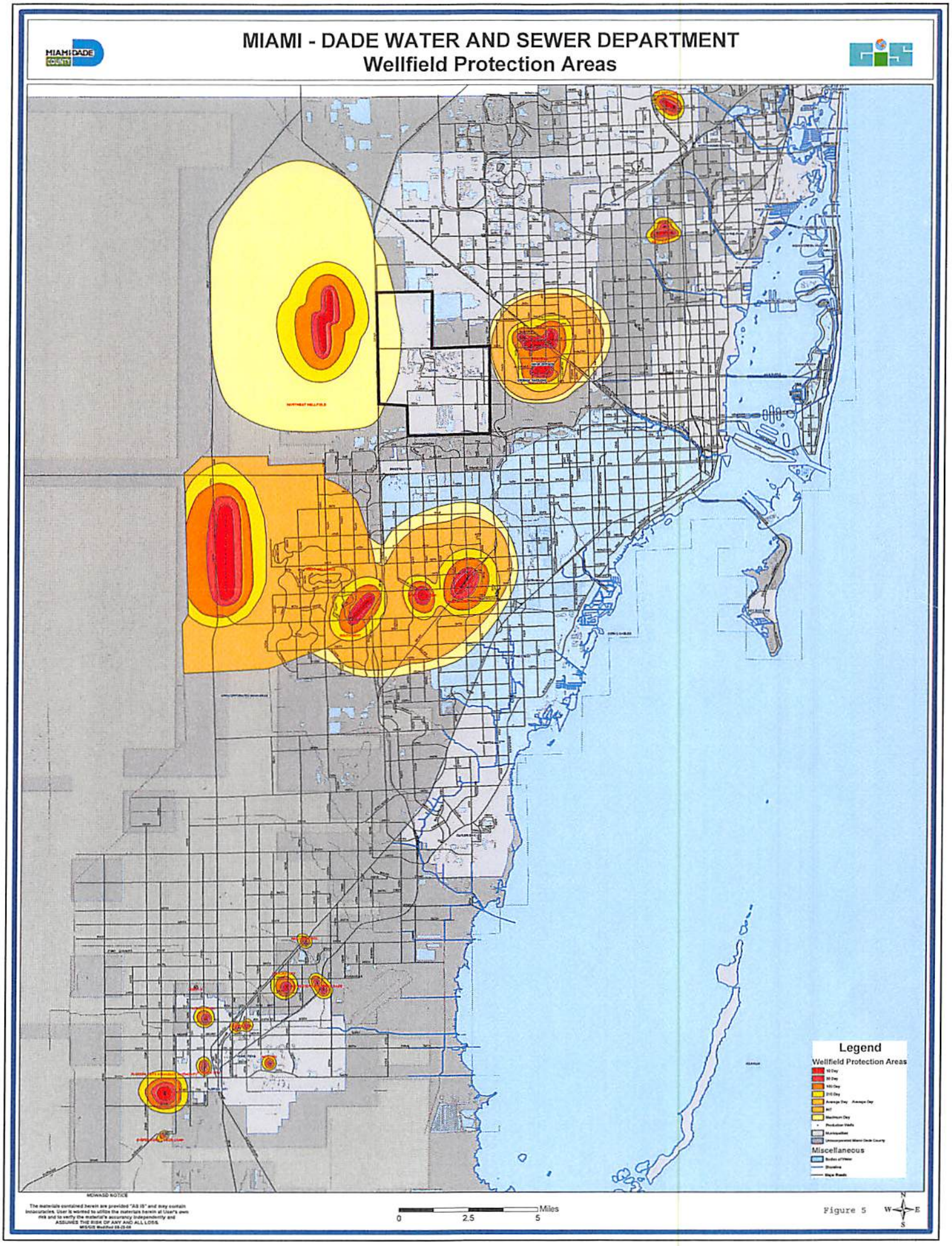


Figure 5


MIAMI - DADE WATER AND SEWER DEPARTMENT
Wellfield Protection Areas
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Wellfield Protection Areas
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Figure 5

APPENDIX A

MIAMI DADE WATER AND SEWER DEPARTMENT
20-YEAR WATER SUPPLY FACILITIES WORK PLAN
(2014-2033)

Miami Dade Water and Sewer Department

20-year Water Supply Facilities Work Plan

(2014 – 2033)

Support Data

November 2014
(Revised January 2015)

Report

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Appendix B ~~Miami-Dade County Capital Improvement Element Tables 8 and 12~~MDWASD FY 2014-2020 Capital Budget and Multi-Year Capital Plan
Appendix C Water Supply for Municipalities
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Appendix E Table 5 Countywide BMP Implementation Schedule, Costs, and Savings Projections from the Water Use Efficiency 5-Year Plan
Appendix F Reuse Project and Deadlines
Appendix G List of Large and Small Public Water Supply Systems
Appendix H MDWASD 20-Year Water Use, Permit, July 16, 2012 Modification
Appendix I MDWASD June 2014 Modification request to the 20-year Water Use Permit

Section 5
Planned Water Supply Facilities

This section details the water supply facilities that are planned in order to meet MDWASD's water demands through 2033. The County's projected finished water demands are now markedly lower than anticipated when the first 20-year water use permit application was submitted to South Florida Water Management District (SFWMD) in 2007. This demand reduction has eliminated the anticipated supply shortages which were the basis for an ambitious schedule of several costly alternative water supply projects which are no longer required or needed. Reuse projects to address water supply have been eliminated. The decrease in water demands is a result of successful implementation of the County's Water Conservation Plan and new population projections based on the 2010 Census. For ease of reference, the project start and finish dates have been provided below the title of the following subsections. ~~The Capital Improvement Elements Tables 8 and 12 located in Appendix B.~~ The adopted FY 2014-2015 Capital Plan for the two alternative water supply projects is included in Appendix B.

5.1 Alternative Water Supply Projects

The following proposed alternative water supply (AWS) projects are to meet MDWASD's water demands through 2033, which encompasses the proposed modification to the 20-year Consumptive Use Permit period. AWS projects have been identified to meet water demands in the MDWASD service area and are presented in **Table 5-1, Table 5-2** and **Figure 5-1**.

The plan described herein demonstrates that the proposed projects, by their location, volume of water produced, and timing of implementation, will be sufficient to meet the water demand increases. These projects will undergo further refinement and development over the next few months. The flow (Q MGD) shown in parentheses below represents the corresponding amount of finished water annual average daily demand (AADD) provided by the projects in terms of million gallons per day (MGD). These AWS projects and AADD assume that all current wholesalers will remain on the MDWASD system through 2033.

Table 5-1: MDWASD) Proposed Alternative Water Supply Projects From Alternative Water Supply Project Development Submitted to SFWMD June 2014

Year	Annual Average Finished Water Quantity in MGD and Source		
2013	7.5	Hialeah Floridan Aquifer RO WTP-Phase 1-a, 10 MGD & 6 Floridan Aquifer supply wells	AWS
2015	2.5	Hialeah Floridan Aquifer RO WTP-Phase 1-b, 4 Floridan Aquifer supply wells	AWS
2018	12.45	South Miami Heights WTP Phase 1(RO portion)	AWS
2030	5.0	South Miami Heights WTP Phase 2(RO portion)	AWS
Total	27.45		

WTP. Everglades Labor Camp and Newton WTPs will remain on stand-by service.

5.2 Miscellaneous Projects

5.2.1 Water Conservation/Non-Revenue Potential Water Loss Reduction Program (Up to 19.62 MGD)

Start 2006
Finish 2027

These projects serve to reduce the demand for water through demand management. They include, but are not limited to, various water conservation projects currently being implemented by MDWASD. The County's Water Use Efficiency Five-Year Plan was approved by the Board and has been expanded to cover the next 20 years with a projected reduction in demand of 19.62 MGD over that time period. Examples of ongoing conservation projects include the bathroom and kitchen retrofits program, Miami-Dade green lodging and restaurant program, , rebates for high efficiency toilets, and landscaping irrigation evaluations for residential, commercial and governmental uses. Similarly, the Non-Revenue Real Water Loss Program identified potential reductions in water demand of as much as 14.25 MGD by 2030 through demand management activities.

5.3 20-Year Work Plan and Capital Improvement Plan

As mentioned in the previous sections, the latest lower population projections based on the 2010 Census results and historically lower per capita daily finish water use have reduced the projected finish water demands which have eliminated the need for other alternative water supply projects by several years. The Alternative Water Supply projects to address water demands through 2033 include the Hialeah RO and South Miami Heights WTP.

The projects for the 20-Year Work Plan have been included in the County's adopted FY 2014-2015 Budget ~~Capital Improvement Element~~. An update to the County's Capital Improvement Element to reflect the adopted FY 2014-2015 Budget will be processed in 2015. A copy of ~~Table 12 from~~ the County's adopted FY 2014-2015 Budget ~~Capital Improvement Element~~ is contained within Appendix ~~D~~B and summarized in **Table 5-3** for the next 5 years ~~(2014 – 2018).~~ (2015-2020).

Table 5-3 MDWASD Water/Alternative Water Supply ~~CIE~~ Projects

Project Name	Expenditure[(a)]						Six Year Totals
	2012~~4~~/ 201~~3~~5	201~~3~~5/ 2014~~6~~	2014~~6~~/ 2015~~7~~	2015~~7~~/ 2016~~8~~	2016~~8~~/ 2017~~9~~	2017~~9~~/ 2018~~20~~	
Water Facilities							
South Miami Heights W.T.P. & Wellfield	4.90 ~~17.11~~	30.44 ~~46.20~~	36.48 ~~43.80~~	5.73 ~~5.19~~	15.73 ~~0.00~~	0.00 ~~0.00~~	93.28 ~~112.31~~
Hialeah Floridan Aquifer R.O.W.T.P. Phase 1 (10.0 mgd)	0.00 ~~23.79~~	0.00 ~~4.77~~	0.00 ~~1.34~~	0.00 ~~7.383~~	0.00 ~~4.08~~	0.00 ~~6.09~~	0.00 ~~47.48~~

Source: MDWASD Adopted ~~FY 2012-2013~~ 2014-2015 budget, (a) Millions of Dollars

5.4 Other Water Suppliers Future Plans

5.4.1 City of North Miami

The City of North Miami's plans for a two-phase expansion of the Winson WTP have been put on hold. The plans entailed a Phase I, to be concluded by 2010, to add an additional 8.5 MGD capacity from a Reverse Osmosis (RO) system. Phase II to add additional membrane treatment to the RO facility, which would create an additional 4.0 MGD capacity. The proposed improvements would total an increase of 12.5 MGD to the capacity of the WTP.

The City also identified that the Floridan aquifer would be the only water resource alternative for the increase in demand. Therefore, the City planned to construct an additional ten Floridan wells to supply the RO Facility. The City planned to add a raw water transmission main from the wells to the WTP.

On hold is also the third expansion plan for the addition of a 5 MG storage tank, to be located on a vacant parcel owned by the City's new Biscayne Landing development. The City may decide to forgo with the construction of the tank and utilize the parcel for another smaller RO Treatment facility or a reuse facility.

These water supply system improvements planned by the City of North Miami will provide water supply for those portions of unincorporated Miami-Dade County which are currently served by the City of North Miami.

The City is currently designing upgrades to the existing facility to maximize its efficiencies.

APPENDIX B

~~Miami-Dade County Capital Improvements Element Tables 8 and 12~~

MDWASD FY 2014-2020 Capital Budget And Multi-Year Capital Plan

MIAMI-DADE COUNTY

Delivering Excellence Every Day

MIAMI-DADE WATER AND SEWER DEPARTMENT

ADOPTED FY 2014-2020 CAPITAL BUDGET AND MULTI-YEAR CAPITAL PLAN

SEPTEMBER 18, 2014

Prepared by Capital Planning and Coordination Section

MIAMI-DADE WATER AND SEWER DEPARTMENT
2014-2020 CAPITAL BUDGET AND MULTI-YEAR CAPITAL PLAN
Projection by Project Sub-project by Year - Water

Version 4

As of: 9/30/2013

Proj	Sub-Proj	Sub-Proj Description	Current Bond/Fund Allocation	Expenditures As of 9/30/2013	Remaining Bond/Fund Allocation	PROJECTIONS 2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
1075	101546	WATER TREATMENT MODIFICATIONS TO COMPLY WITH SURFACE WATER TREATMENT AND DISINFECTANT/DISINFECTION BY PRODUCT REGULATIONS	532,824,088	13,200,885	519,623,203	300,000	1,000,000	7,500,000	20,000,000	176,682,053	180,710,573	133,430,577	0	0	0	0	519,623,203
	101891	NEW NWWF HIGH SERVICE PUMP STATION	43,250,000	0	43,250,000	0	0	1,500,000	10,000,000	15,000,000	14,500,000	2,250,000	0	0	0	0	43,250,000
		TOTAL - 1075	**585,954,088**	**13,200,885**	**572,753,203**	**300,000**	**1,300,000**	**12,200,000**	**33,300,000**	**194,762,053**	**195,210,573**	**135,680,577**	**0**	**0**	**0**	**0**	**572,753,203**
1077	101364	SOUTH MIAMI HEIGHTS WTP AND WF - NEW WATER TREATMENT PLANT	75,456,139	5,389,891	70,066,248	200,000	1,500,000	20,000,000	26,913,097	5,727,131	15,726,020	0	0	0	0	0	70,066,248
	101365	SOUTH MIAMI HEIGHTS WTP AND WF - NEW WELLFIELD	20,878,062	2,836,758	18,041,304	100,000	1,500,000	7,500,000	8,941,305	0	0	0	0	0	0	0	18,041,305
	101575	CONSTRUCTION MANAGEMENT AT SOUTH MIAMI HEIGHTS WTP	4,700,000	1,993,567	2,706,433	123,356	500,000	1,460,764	622,313	0	0	0	0	0	0	0	2,706,433
	101778	DESIGN AND CONSTRUCTION OF PROPOSED 16 INCH WATER MAIN	4,500,000	1,477,596	3,022,404	144,249	1,400,000	1,478,155	0	0	0	0	0	0	0	0	3,022,404
	102020	SOUTH MIAMI HEIGHTS FA MEMBRANES WTP	42,000,000	0	42,000,000	0	0	0	0	0	0	0	42,000,000	0	0	0	42,000,000
	102021	SOUTH MIAMI HEIGHTS - FA WELLS AND PIPING	21,600,000	0	21,600,000	0	0	0	0	0	0	0	21,600,000	0	0	0	21,600,000
		TOTAL - 1077	**169,134,201**	**11,697,812**	**157,436,389**	**567,605**	**4,900,000**	**30,438,919**	**36,476,715**	**5,727,131**	**15,726,020**	**0**	**63,600,000**	**0**	**0**	**0**	**157,436,390**
1078	101368	TELEMETERING SYSTEM - WATER	17,297,263	2,650,110	14,647,153	2,214,885	1,133,067	2,433,067	2,433,067	2,433,067	2,000,000	2,000,000	0	0	0	0	14,647,153

MIAMI-DADE WATER AND SEWER DEPARTMENT
2014-2020 CAPITAL BUDGET AND MULTI-YEAR CAPITAL PLAN
Projection by Project Sub-project by Year - Water
As of: 9/30/2013

Version 4

Proj	Sub-Proj	Sub-Proj Description	Current Bond/Fund Allocation	Expenditures As of 9/30/2013	Remaining Bond/Fund Allocation	PROJECTIONS 2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
		TOTAL - 1078	17,297,263	2,650,110	14,647,153	2,214,885	1,133,067	2,433,067	2,433,067	2,433,067	2,000,000	2,000,000	0	0	0	0	14,647,153
1080	101679	HIALEAH FLORIDAN AQUIFER R.O. W.T.P. PHASE 1 (10 MGD) - GOB IN 1065.101956	45,608,637	44,756,907	851,730	851,730	0	0	0	0	0	0	0	0	0	0	851,730
	101737	HIALEAH FLORIDAN AQUIFER R.O. W.T.P. PHASE 2 (5 MGD)	12,816,075	0	12,816,075	0	0	0	0	0	0	0	12,816,075	0	0	0	12,816,075
	101738	HIALEAH FLORIDAN AQUIFER R.O. W.T.P. PHASE 3 (2.5 MGD)	6,099,000	0	6,099,000	0	0	0	0	0	0	0	6,099,000	0	0	0	6,099,000
		TOTAL - 1080	64,523,712	44,756,907	19,766,805	851,730	0	0	0	0	0	0	18,915,075	0	0	0	19,766,805
1081	101966	INSTALLATION OF 12-INCH DIWM ON EAST DRIVE FROM NW 36 ST. TO LABARON DR.	687,042	602,944	84,098	50,000	34,098	0	0	0	0	0	0	0	0	0	84,098
		TOTAL - 1081	687,042	602,944	84,098	50,000	34,098	0	0	0	0	0	0	0	0	0	84,098
1082	101969	WATER - PIPES AND INFRASTRUCTURE PROJECTS	83,608,444	29,122,567	54,485,877	10,775,476	8,000,000	14,906,409	6,201,688	5,547,738	4,874,170	4,180,396	0	0	0	0	54,485,877
		TOTAL - 1082	83,608,444	29,122,567	54,485,877	10,775,476	8,000,000	14,906,409	6,201,688	5,547,738	4,874,170	4,180,396	0	0	0	0	54,485,877
		TOTAL - Water	4,067,616,612	410,768,117	3,656,848,495	83,880,760	119,010,688	214,146,080	255,797,526	418,171,885	403,102,053	305,885,696	1,852,270,268	2,583,540	2,000,000	0	3,656,848,496

Miami Dade Water and Sewer Department

20-year Water Supply Facilities Work Plan

(2014 – 2033)

Support Data

November 2014

Report

Executive Summary

The Update to the Miami-Dade Water and Sewer Department's (MDWASD) 20-Year Water Supply Facilities Work Plan is prepare as required by Section 163.3177(6)(c)3 of the Florida Statutes. Said statutory provision requires all local governments to adopt a water supply work plan that identifies the alternative water supply projects, traditional water supply projects and conservation and reuse measures necessary to meet projected water demand. The work plan is to be updated, at a minimum, every five years and within 18-months of an adopted update to the regional water supply plan. The Lower East Coast (LEC) Regional Water Supply Plan was adopted by the South Florida Water Management District Governing Board in September 2013.

The Water Supply Facilities Work Plan Update presents MDWASD's water supply systems and provides a plan for implementing water supply facilities, including the development of traditional and alternative water supplies necessary to serve existing and new development.

This Water Supply Facilities Work Plan Update includes the following primary sections:

- Section 1 - Introduction
- Section 2 – Water Service Area
- Section 3 – Existing Water Supply Facilities
- Section 4 – Population and Water Demand Projections
- Section 5 – Planned Water Supply Facilities
- Section 6 – Climate Change and Sea Level Rise Plan

The County's projected finished water demands are now significantly lower than anticipated when the first 20-year water use permit application was submitted to South Florida Water Management District (SFWMD) in 2007. The updated water demand projections have resulted in a 71 million gallons per day decrease by the year 2030. This demand reduction has eliminated the anticipated supply shortages which were the basis for an ambitious schedule of several costly alternative water supply projects which are no longer required or needed. As such, reuse projects to address water supply have been eliminated. However, MDWASD will be implementing a total of 117.5 mgd of

reuse to address the Ocean Outfall Legislation which includes 27.6 mgd of Floridan Aquifer Recharge and up to 90 mgd of reuse water to FPL for Turkey Point Units 5, and6.

The decrease in water demands has been a result of the successful implementation of the County's Water Conservation Plan, and new population projections based on the 2010 Census. Through 2013, a total of 11.2 mgd have been saved through the implementation of the Water Conservation Plan Best Management Practices. Additionally, Miami-Dade County has enacted water use efficiency-legislation including permanent landscape irrigation restrictions, landscape ordinances requiring Florida Friendly landscaping in new construction, in right of ways, and the installation of high efficiency plumbing fixtures in new construction

Based on the decrease in water demands, MDWASD submitted an application for modification and extension of the 20-year Water Use Permit (WUP) on June 20, 2014. The requested modification to the WUP included new population data, revised water demand projections and alternative water supply projects to support water demands through the year 2033. The alternative water supply project include a new South Miami Heights Reverse Osmosis Water Treatment Plant with a capacity of 17.45 mgd. This update to the Water Supply Plan reflects the water supply projects required per the WUP Modification request, which is anticipated to be approved by November 2014.

In addition, MDWASD's evaluation and planning for sea level rise and climate change is detailed over the planning horizon in the Work Plan. The primary concern to MDWASD water supply is salt water intrusion into the freshwater Biscayne aquifer, the primary source of drinking water in Miami-Dade County. Results of evaluation and data analysis completed to date indicate that within the next thirty years, MDWASD will be able to operate its wellfields and water treatment facilities as designed, as groundwater modeling indicates even with a high level of projected sea level rise, the wellfields will not be impacted by salt water intrusion. Further modeling is currently underway to extend the planning scenarios fifty years out, and will include climate change such as increases and decreases in annual precipitation, and extreme weather events.

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Appendix J MDWASD September 19, 2014 Response to Request For Information for the 20-year Water Use Permit Modification

Section 1

Introduction

Miami-Dade County (County) is continuing to experience growth, as it has over the last several decades. The Miami-Dade Water and Sewer Department (MDWASD) provides drinking water to approximately two million customers in the County. Because of rapid population growth, complex environmental issues and regulatory and statutory requirements, MDWASD is updating its comprehensive 20- year plan for water supply development. The previous Water Supply Facilities Work Plan was dated April 2008 and adopted by the County's Board of County Commissioners on April 24, 2008.

1.1 Background

In response to the finding that traditional water supply sources will not be sufficient to meet demands of the growing population, of industries and of the environment, the Florida Legislature enacted bills in 2002, 2004 and 2005. These bills, Senate Bills 360 and 444, significantly changed Chapters 163 Intergovernmental Programs and 373 Water Resources, Florida Statute (F.S.), to improve the coordination of water supply and land use planning by strengthening the statutory requirements linking regional water supply plans prepared by the water management districts and the comprehensive plans prepared by local governments.

Section 373.709, Florida Statutes, Section 163.3177(6)(c)3, Florida Statutes, requires that the water supply and work plan be updated within 18 months after a water management district's governing board approves an updated regional water supply plan to reflect whatever changes in the regional plan affect their local water supply and work plan. The current statutory provisions direct local governments to do the following with regard to water supply:

1. Coordinate appropriate aspects of its comprehensive plan with the appropriate water management district's regional water supply plan. [s. 163.3177(4)(a), F.S.]

2. Revise the Potable Water Sub-Element to adopt a water supply facilities work plan covering at least a 10-year planning period to meet existing and projected demand. The work plan should address those water supply facilities for which the local government has responsibility and include the facilities needed to develop alternative water supplies. The work plan should also identify conservation and reuse measures to meet future needs. [Section 163.3177(6)(c), Florida Statutes.]

3. Revise the Conservation Element to assess current and projected water needs and sources for at least a 10-year planning period. The analysis must consider the existing levels of water conservation, use, and protection and the applicable policies of the water management district, and the district's approved regional water supply plan. In the absence of an approved regional water supply plan,

the analysis must consider the district's approved water management plan. [Section 163.3177(6)(d)3, Florida Statutes.]

4. Revise the Capital Improvements Element to identify capital improvements projects to be implemented in the first 5 years of the work plan for which the local government is responsible, including both publicly and privately funded water supply projects necessary to achieve and maintain adopted level of service standards; and adopt a five-year schedule of capital improvements to include those projects as either funded or unfunded, and if unfunded, assigned a level of priority for funding. [163.3177(3)(a)4, Florida Statutes.]

5. Revise the Intergovernmental Coordination Element to adopt principles and guidelines to be used to coordinate the comprehensive plan with the regional water supply authority (if applicable) and with the applicable regional water supply plan. [163.3177(6)(h)1, Florida Statutes.]

6. During the Evaluation and Appraisal review, determine if comprehensive plan amendments are necessary to reflect statutory changes related to water supply and facilities planning since the last update to the comprehensive plan. If necessary, transmit the amendments to incorporate the statutory changes as appropriate. [Section 163.3191(1) and (2), Florida Statutes.]

7. Ensure that adequate water supplies and facilities are available to serve new development no later than the date on which the local government anticipates issuing a certificate of occupancy and consult with the applicable water supplier prior to approving a building permit, to determine whether adequate water supplies will be available to serve the development by the anticipated issuance date of the certificate of occupancy. [s. 163.3180(2)(a), F.S., effective July 1, 2005.] Local governments should update their comprehensive plans and land development regulations as soon as possible to address this water supply concurrency requirement.

This Water Supply Facilities Work Plan Update is meant to satisfy portions of the above statutory requirements (other portions are satisfied through existing policies in the County's Comprehensive Development Master Plan) as stated in Item 1 above, to coordinate with the Lower East Coast (LEC) regional water supply plan. The 2013 LEC Water Supply Plan Update was adopted by the South Florida Water Management District (SFWMD) Governing Board on September 12, 2013.

1.2 Purpose and Objectives

The purpose of this Water Supply Facilities Work Plan Update is to present MDWASD's water supply systems and to provide a plan for implementing water supply facilities, including the development of traditional and Alternative Water Supplies necessary to serve existing and new development. These water supplies were developed by first incorporating demand reductions due to conservation. In addition,

this plan incorporates information on wholesale customers and other water suppliers that provide water to portions of Miami-Dade County: the City of North Miami, the City of North Miami Beach, and the City of Homestead.

On May 2, 2014, the MDWASD and the SFWMD held a joint workshop with local governments to assist them in their efforts to prepare an update to the Water Supply Facilities Work Plan (Work Plan). MDWASD will coordinate and provide information to the local governments in Miami-Dade County to assist them in the preparation of their Work Plans Update.

The information contained within this Work Plan Update will be included in an amendment to various elements of the County's Comprehensive Plan. This Work Plan Update is to be updated and updated every five years within 18 months after the SFWMD Governing Board approves an updated LEC regional water supply plan.

This Water Supply Facilities Work Plan Update includes the following primary sections:

- Section 1 - Introduction
- Section 2 – Water Service Area
- Section 3 – Existing Water Supply Facilities
- Section 4 – Population and Water Demand Projections
- Section 5 – Planned Water Supply Facilities
- Section 6 – Climate Change

Section 2

Water Service Area

2.1 MDWASD Service Area

The MDWASD water service area contains interconnected systems and thus, for the most part, functions as a single service area. However, for the convenience of discussing existing facilities, the service area may be broken down into three subareas by water treatment facilities: the Hialeah-Preston area serving the northern part of Miami-Dade County, the Alexander Orr, Jr. area serving the central and portions of the southern part of Miami-Dade County and the South Dade area (formerly known as the Rex Utility District) serving the southern part of Miami-Dade County, shownon **Figure 2-1**.

Within the MDWASD service area, there are 15 wholesale customers. Thirteen (13) of the fifteen (15) wholesale customers have executed 20-year water use agreements, and one (1) has executed a 30-year water agreement. The water use agreement between MDWASD and the City of Hialeah is currently under negotiations. The City of North Miami Beach stopped purchasing water from MDWASD in 2008, and has a 30-year wholesale agreement with MDWASD to purchase water on an as needed basis. The City of Miami Springs is no longer a wholesale customer of MDWASD, as the water and sewer infrastructure was transferred to the County in July 2008. Table 2-1 identifies the 15 wholesale customers and the status of their large user contracts.

In addition to MDWASD, there are four other water suppliers within Miami-Dade County that provide water to parts of unincorporated Miami-Dade County and within their respective municipal boundaries. Two such water suppliers in the South Dade area are Florida City and the City of Homestead. MDWASD does not have an agreement with Florida City. Water is sold to and purchased from the City of Homestead. MDWASD purchases water from the City of Homestead to provide water to serve the Redavo area and pays retail rates. In 2010, the City of Homestead entered into a 20-year water use agreement with MDWASD to purchase up to 3 MGD to meet the demands of its retail water customers. The water furnished will be received by the City of Homestead at the interconnection point located at SW 137th Avenue and 288th Street. In the North Dade area, the City of North Miami and the City of North Miami Beach provide water to portions of unincorporated and incorporated parts of Miami-Dade County.

2.2 Hialeah-Preston Subarea

The Hialeah-Preston (H-P) subarea is comprised of dedicated low-pressure pipelines, remote storage tanks, pumping facilities and high pressure systems. This system delivers water to Hialeah, Miami Springs, the City of Miami and other portions of northeastern Miami-Dade County, shown on **Figure 2-2,**

generally north of Flagler Street. The Hialeah Reverse Osmosis (R.O.) plant was completed in October 2013 and is providing water to the City of Hialeah and unincorporated Miami-Dade County.

2.3 Alexander Orr, Jr. Subarea

The Alexander Orr, Jr. (AO) subarea is comprised of a high pressure system comprised of two major piping loops. This system delivers water to nearly all of Miami-Dade County south of approximately Flagler Street and north of SW 248th Street, including Virginia Key, Fisher Island, the Village of Key Biscayne and, upon request, to the City of Homestead, and Florida City, shown on **Figure 2-3.**

2.4 South Dade Subarea

The South Dade subarea consists of small distribution systems and storage tanks that evolved around each individual water treatment plant (WTP) within each WTP's distinct service areas. These systems deliver water to nearly all of Miami-Dade County south of S.W. 248th street and east of S.W. 197th avenue. Homestead and Florida City are within this area. Florida City provides water service within its incorporated boundaries and to a small portion of unincorporated Miami-Dade County. In addition, Florida City purchases water from the City of Homestead to service a small portion of Florida City's service area on the southeast corner of U.S. 1 and S.W. 328th Street. The City of Homestead provides water within its municipal boundary and for a portion of unincorporated Miami-Dade County including the Redavo development. This development consists of 107 homes and an approximate population of 310. **Figure 2-4** shows the current South Dade subarea.

The design of the new South Miami Heights (SMH) WTP in the South Dade subarea is underway. The SMHWTP is scheduled to come on line by December 31, 2018. Of the five existing plants in the South Dade subarea, only Everglades and Newton WTPs will remain in service on a stand-by-basis after the SMHWTP begins operations. The existing distribution and storage systems will be incorporated into the future plans. A general shift will occur in the northern boundary of the South Dade subarea once the proposed South Miami Heights Water Treatment Plant comes into service by 2018. The northern boundary will be shifted northward such that portions of the population currently within the Alexander-Orr subarea will be within the South Dade subarea. Figure 2-1 and 2-4 illustrate the boundary shift. The boundary shift will cause a general redistribution of service between the Alexander-Orr and South Miami-Dade areas, but will not have other effects on the population expected to be served by MDWASD.

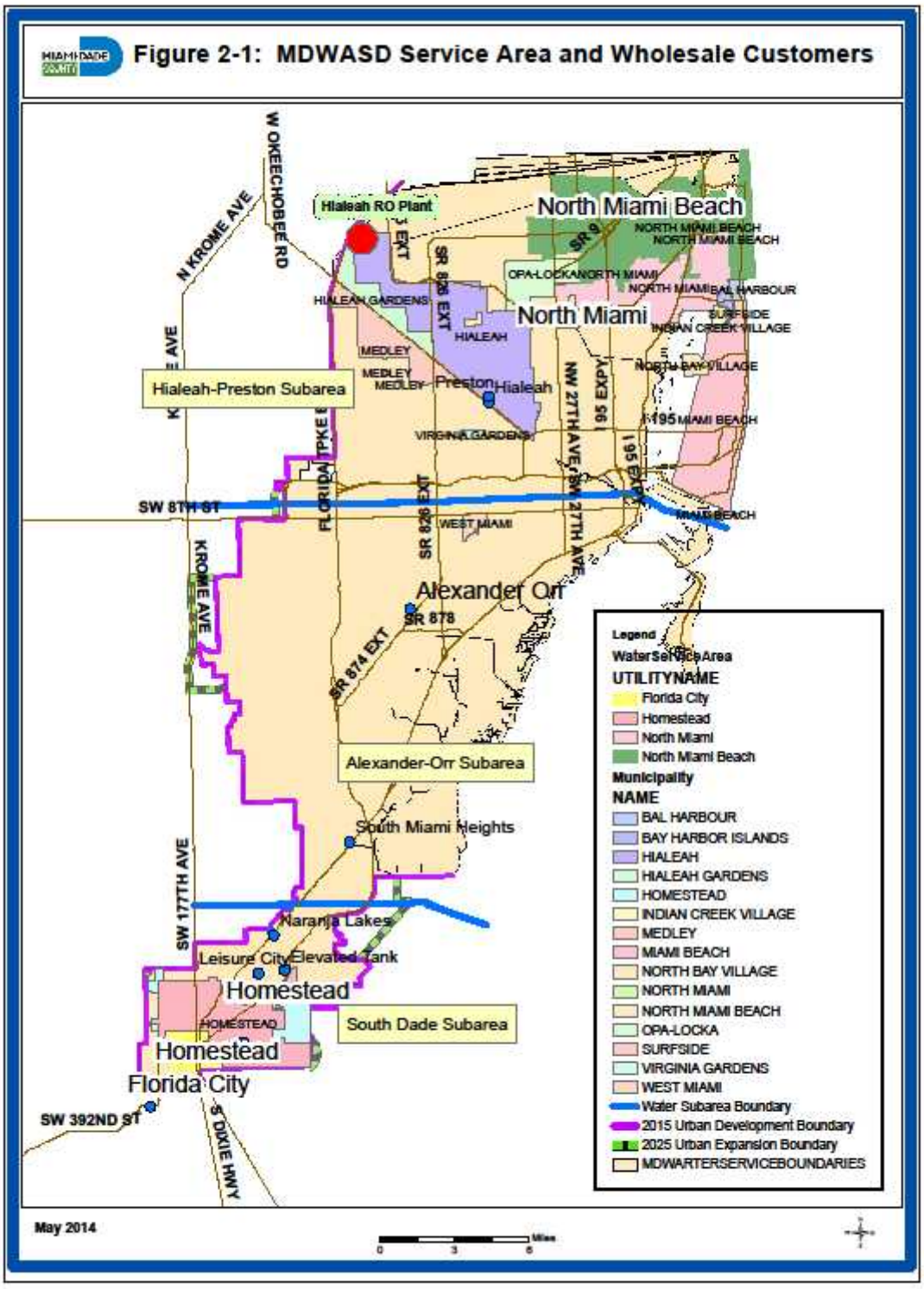
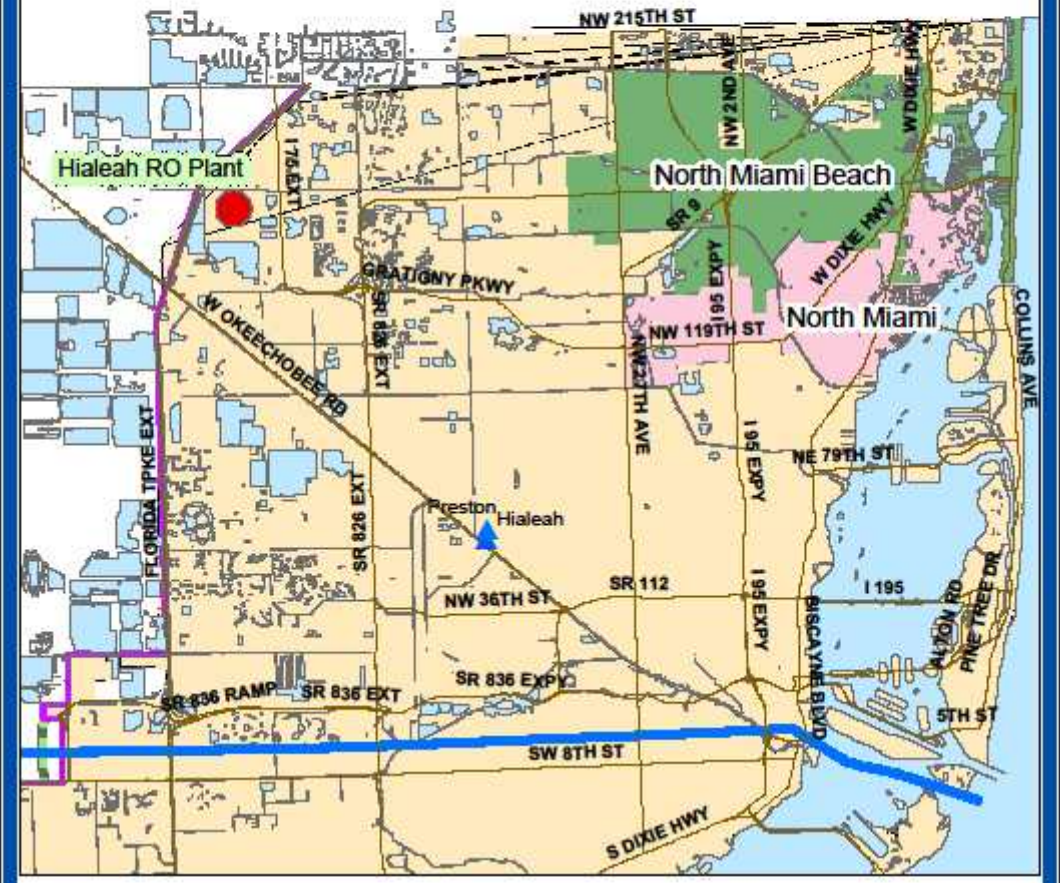


Figure 2-1: MDWASD Service Area and Wholesale Customers
Hialeah RO Plant
North Miami Beach
North Miami
Hialeah-Preston Subarea
Alexander-Orr Subarea
South Dade Subarea
Preston
Hialeah
Alexander Orr
South Miami Heights
Naranja Lakes
Leisure City Elevated Tank
Homestead
Florida City
SW 8TH ST
SW 392ND ST
SW 177TH AVE
KROME AVE
N KROME AVE
W OKEECHOBEE RD
FLORIDA TPKE
SR 826 EXT
SR 874 EXT
SR 878
SR 836
I-95
NW 27TH AVE
HIALEAH GARDENS
MEDLEY
OPA-LOCKA
NORTH MIAMI
NORTH MIAMI BEACH
BAL HARBOUR
SURFSIDE
INDIAN CREEK VILLAGE
NORTH BAY VILLAGE
MIAMI BEACH
VIRGINIA GARDENS
WEST MIAMI
S DIXIE HWY
Legend
WaterServiceArea
UTILITYNAME
Florida City
Homestead
North Miami
North Miami Beach
Municipality
NAME
BAL HARBOUR
BAY HARBOR ISLANDS
HIALEAH
HIALEAH GARDENS
HOMESTEAD
INDIAN CREEK VILLAGE
MEDLEY
MIAMI BEACH
NORTH BAY VILLAGE
NORTH MIAMI
NORTH MIAMI BEACH
OPA-LOCKA
SURFSIDE
VIRGINIA GARDENS
WEST MIAMI
Water Subarea Boundary
2015 Urban Development Boundary
2025 Urban Expansion Boundary
MDWARTERSERVICEBOUNDARIES
May 2014
Miles
0
3
6

Figure 2-2:
Hialeah-Preston Sub-Area and Water Treatment Plants



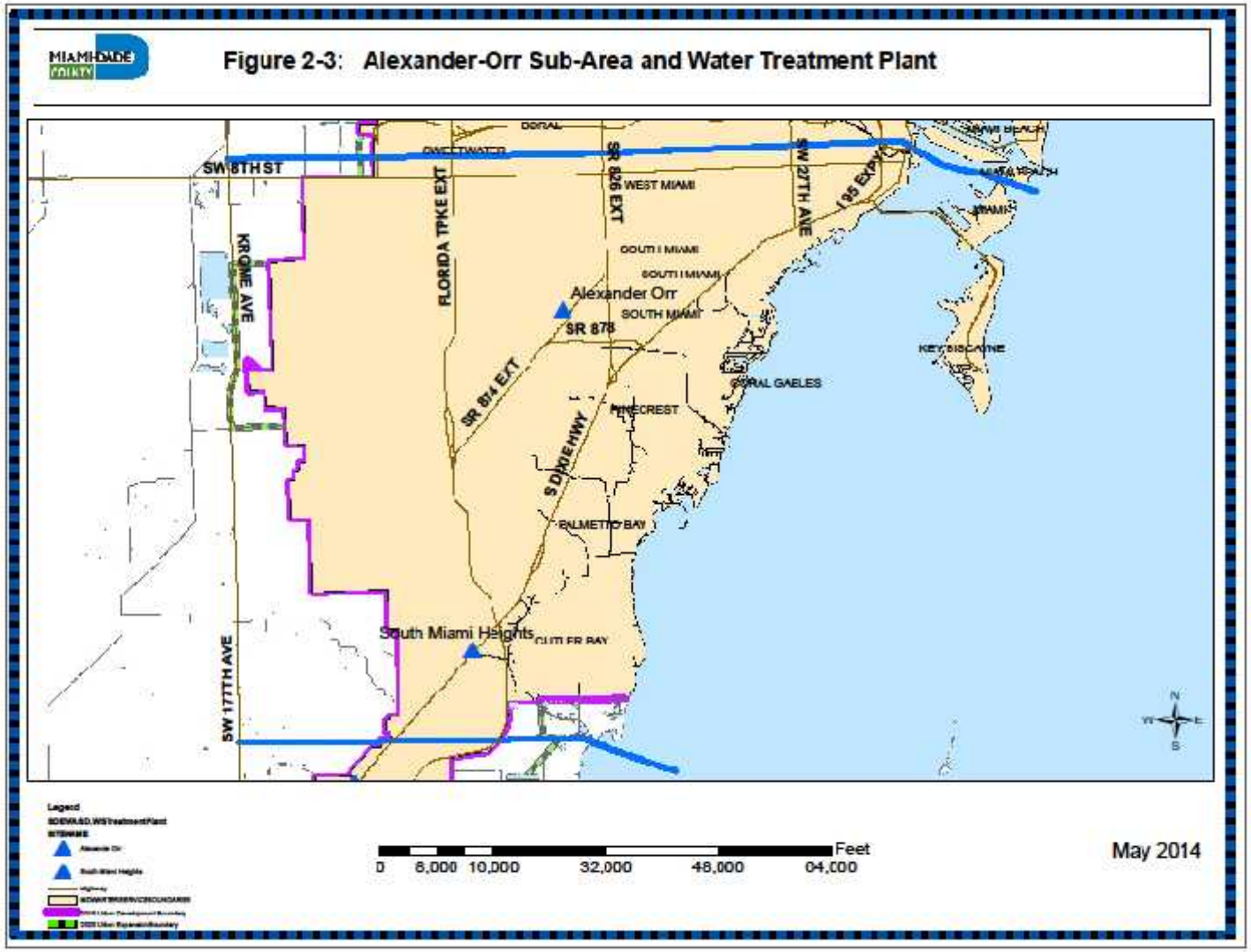


Figure 2-3: Alexander-Orr Sub-Area and Water Treatment Plant
SW 8TH ST
KROME AVE
FLORIDA TPKE EXT
SR 826 EXT
SW 27TH AVE
WEST MIAMI
SOUTH MIAMI
Alexander Orr
SR 878
SR 874 EXT
SOUTH DIXIE HWY
PINECREST
CORAL GABLES
KEY BISCAYNE
PALMETTO BAY
South Miami Heights
SW 177TH AVE
Feet
0 8,000 16,000 32,000 48,000 64,000
May 2014

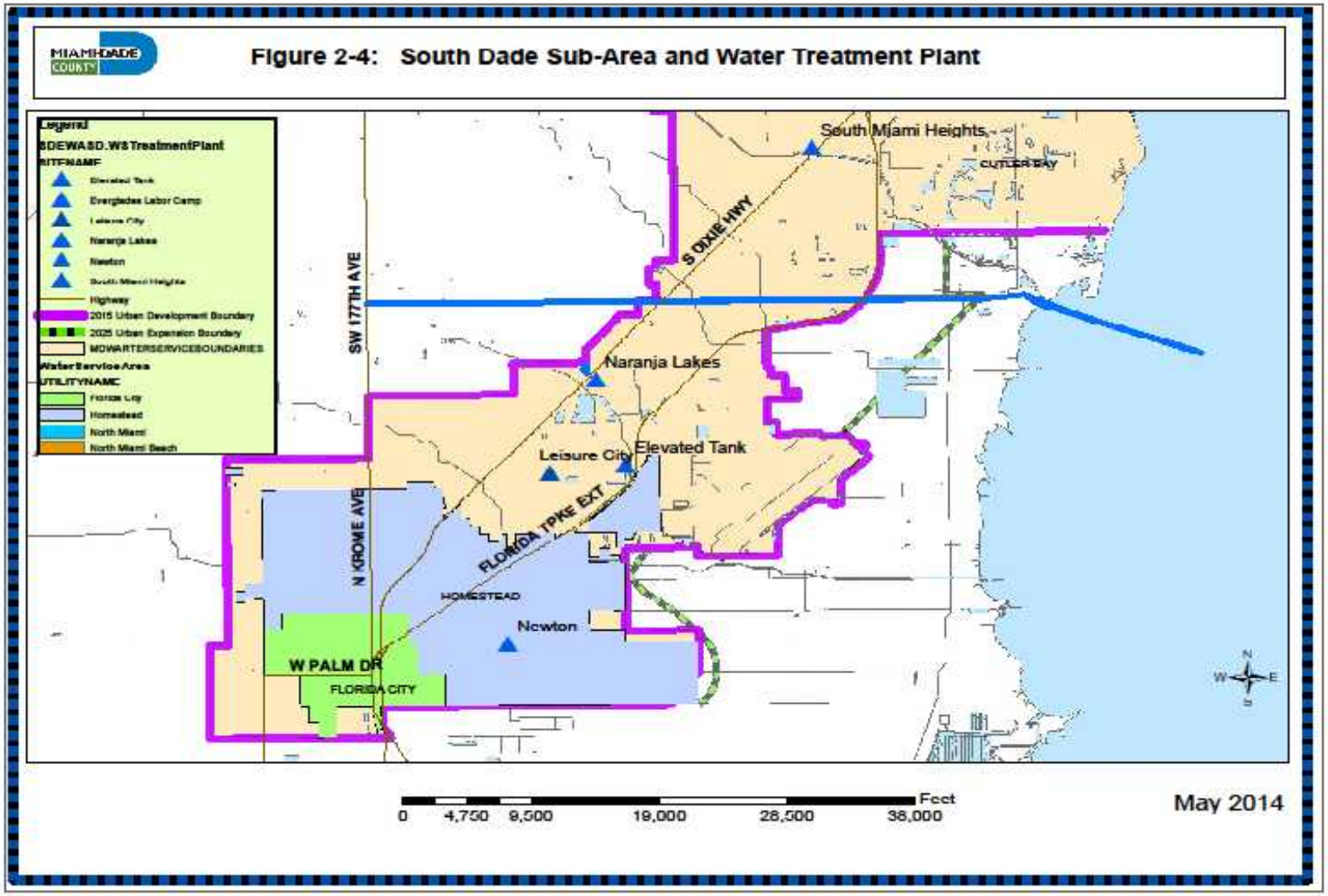


Figure 2-4: South Dade Sub-Area and Water Treatment Plant
Legend
SDEWASD.WSTreatmentPlant
SITENAME
Everglades Labor Camp
Naranja Lakes
Newton
South Miami Heights
Highway
2015 Urban Development Boundary
2025 Urban Expansion Boundary
MDWATERSERVICESBOUNDARIES
Water Service Area
UTILITYNAME
Florida City
Homestead
North Miami
North Miami Beach
South Miami Heights
CUTLER BAY
S DIXIE HWY
SW 177TH AVE
Naranja Lakes
Leisure City
Elevated Tank
FLORIDA TPKE EXT
N KROME AVE
HOMESTEAD
Newton
W PALM DR
FLORIDA CITY
N
W
E
S
0
4,750
9,500
19,000
28,500
38,000
Feet
May 2014

2.5 Wholesale Customers

Fourteen (14) of the 15 wholesale water customers within the MDWASD service area have large user agreements. One (1) wholesale water agreement with the City of Hialeah is under negotiations. These agreements, with the exception of the City of North Miami Beach, are for 20-year periods. The water agreement with the City of North Miami Beach is for a period of 30-years. In 2007, the City of Miami Springs indicated their desired to pursue the transfer of the Miami Springs water and sewer department to the County. Said transfer was approved by the Miami-Dade County Board of County Commissioners (BCC) on July 17, 2008. **Table 2-1** identifies the 15 wholesale customers and the status of their large user contracts.

As outlined in the Miami-Dade County Code of Ordinances, Chapter 2, Article XXXVII, Section 2-347, if a private or municipal water or sewer utility proposes to expand its assigned service area, the Director or designee shall determine whether or not the Department shall release the portion of the service area requested.

Table 2-1 Wholesale Water Agreements for 20 Year Period

Municipality	Status
Bal Harbour Village (BLH)	Signed, executed agreement
Town of Bay Harbour Islands (BHI)	Signed, executed agreement
City of Hialeah (CH)	20 Year agreement under negotiation. Joint participation agreement between Miami-Dade County and the City of Hialeah for the RO Plant was entered on 12/27/07.
City of Hialeah Gardens (HG)	Signed, executed agreement
City of Homestead (HOMSTD)	Signed, executed agreement; 3 MGD Max.
Indian Creek Village (IC)	Signed, executed agreement
Town of Medley (MED)	Signed, executed agreement
City of Miami Beach (MB)	Signed, executed agreement
City of North Bay Village (NB)	Signed, executed agreement
City of North Miami (NM)	Signed, executed agreement
City of North Miami Beach (NMB)	Signed, executed agreement, as needed basis
City of Opa-Locka (OPLOC)	Signed, executed agreement
Town of Surfside (SURFS)	Signed, executed agreement
Village of Virginia Gardens (VG)	Signed, executed agreement
City of West Miami (WM)	Signed, executed agreement

Source: MDWASD Water Use Permit No. 13-00017-W, Re-issue July 16, 2012

2.6 Other Water Suppliers (Non-MDWASD)

Other water suppliers located in Miami-Dade County have facilities and provide water to portions of Miami-Dade County. These facilities are located in the extreme northern and extreme southern parts of the County as shown in **Figure 2-5**. Other water suppliers within the County are:

- City of North Miami
- City of North Miami Beach
- Florida City
- City of Homestead

The Florida Keys Aqueduct Authority (FKAA) has facilities in the southern part of the County to serve Monroe County. These facilities include supply wells, a treatment facility and a transmission main to serve Monroe County.

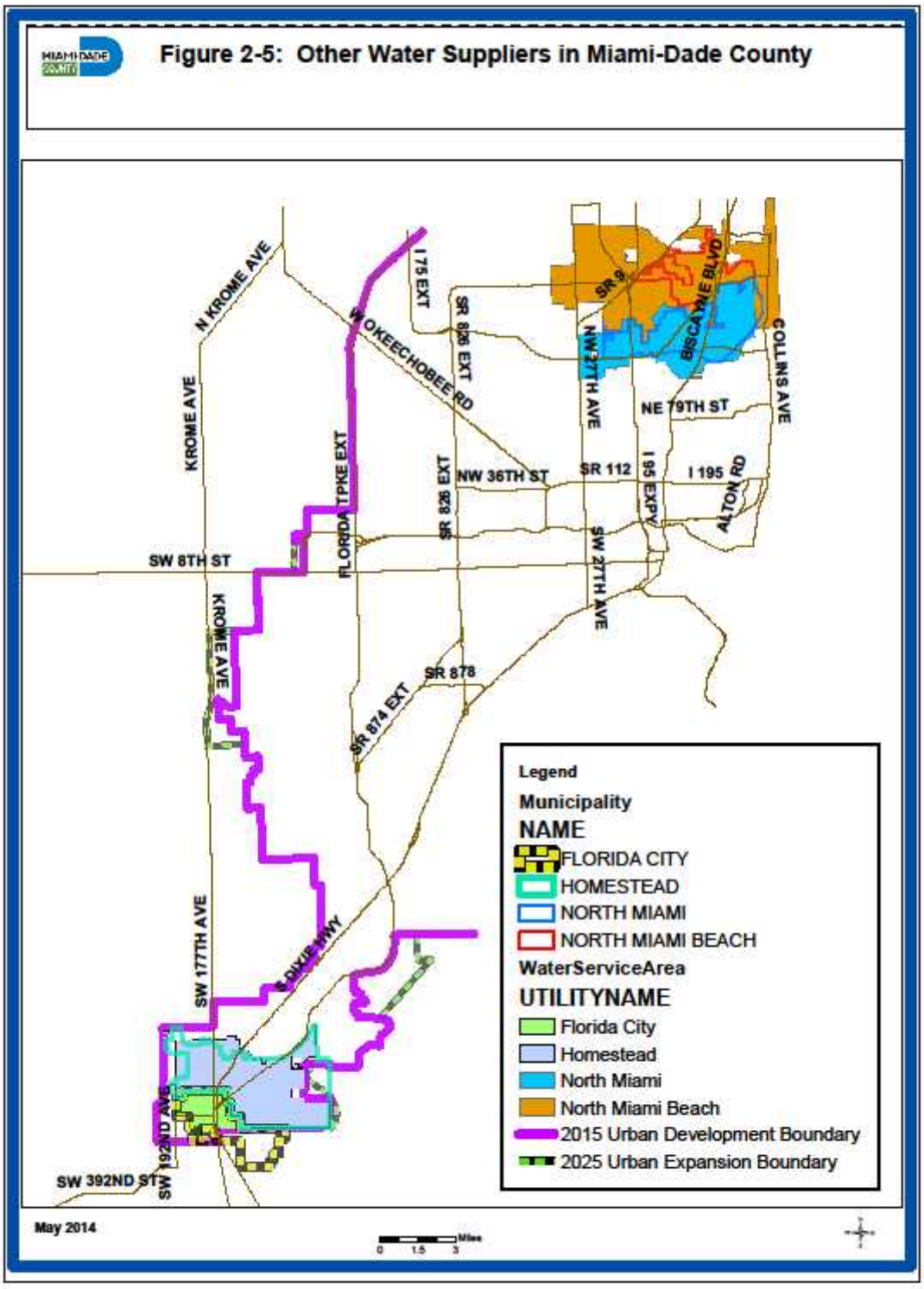
2.6.1 City of North Miami

In the northern part of the County, the City of North Miami provides water service to parts of northern Miami-Dade County within its municipal boundaries, as well as outside of its municipal boundaries extending into the northwestern parts of unincorporated Miami-Dade County.

The City's service area consists of a high pressure distribution system comprised of three main distribution lines, which are interconnected. The service area is generally bounded by NE 163rd Street to the north, Biscayne Bay to the east, NW 105th Street to the south, and NW 27th Avenue to the west. It serves a population of over 91,000 people in a 13 square-mile area, servicing the City of North Miami, the Village of Biscayne Park, small area of Miami Shores, and parts of unincorporated Miami Dade County. The City currently purchases approximately 37% of their water needs from MDWASD.

2.6.2 City of North Miami Beach

In the northern part of the County, the City of North Miami Beach provides water service to parts of northern Miami-Dade County within its municipal boundaries, as well as outside of its municipal boundaries extending into the northeastern and northwestern parts of unincorporated Miami-Dade County. The City of North Miami Beach provides service entirely or to portions of the City of Aventura, Town of Golden Beach, City of Miami Garden, and City of Sunny Isles Beach. The City of North Miami Beach has emergency interconnections with Bal Harbor Village, City of Hallandale Beach, and City of North Miami.



The City's distribution system consists of a high pressure system, distributing

potable water service to more than 163,962 people in northeast Miami-Dade County, specifically servicing the City of North Miami Beach, City of Miami Gardens, City of Aventura, City of Golden Beach, and City of Sunny Isles Beach and some areas of unincorporated Miami-Dade County. The service area is generally bounded by the Snake Creek Canal and Ives Dairy Road to the north, NW 37th Avenue to the west, NE and NW 135th Street to the south, and Collins Avenue to the east. Only about 25 percent of the City system's service area is within City limits.

2.6.3 City of Homestead

The City of Homestead provides water within most of its municipal boundaries and to a small part of southern Miami-Dade County including a portion of Florida City and parts of unincorporated Miami-Dade County. The City of Homestead sells water to MDWASD to serve a portion of unincorporated Miami-Dade County in a development consisting of 107 homes. This development, named Redavo, has an estimated population of 310. Currently, the City of Homestead and Miami-Dade County have an agreement.

Pursuant to the terms of a Consent Decree between the City of Homestead and the SFWMD, dated December 7, 2009, the City is required to reduce its withdrawl from the Biscayne Aquifer by approximately 3 MGD to meet the conditions of the City's Water Use Permit. On July 9, 2010, the City of Homestead entered into a 20-year water wholesale agreement with MDWASD to purchase up to 3 MGD of water to meet the demands of its retail customers.

In addition, MDWASD provides some water service within portions of the municipal boundary of the City of Homestead. Furthermore, the City of Homestead sells water to Florida City to service a small portion of Florida City's service area on the southeast corner of U.S. 1 and S.W. 328th Street.

The City of Homestead's service area comprises a high pressure water distribution system that services approximately 10,240 acres in southern Miami-Dade County, with an estimated present population of over 65,000. The service area is generally bounded by SW 296th Street to the North, SW 137th Avenue to the east, SW 344th Street to the south, and SW 192nd Avenue to the west.

2.6.4 Florida City

In the southern part of the County, Florida City provides water service to parts of southern Miami-Dade County within its municipal boundaries and to a small portion of unincorporated Miami-Dade County. The City's service area is comprised by a high pressure distribution system that services approximately 1,520 acres in southern Miami-Dade County. The service area has a current population of over 9,700, and is generally bounded by SW 328th Street to the north, SW 172nd Avenue/SW 167th Avenue to the east, SW352nd Street/SW 360th Street to the south, and SW 187th Avenue to the west.

2.6.5 Florida Keys Aqueduct Authority

The Florida Keys Aqueduct Authority (FKAA) has facilities in the southern part of the County to serve Monroe County. The FKAA does not provide service within Miami- Dade County, despite some of their water supply, treatment, and transmission facilities being located within Miami-Dade County. These facilities include supply wells, a treatment facility and a transmission main to serve Monroe County.

2.6.6 Large and Small Public Water Supply Systems

Additional public water supply systems within Miami-Dade County exist. Miami-Dade County has conducted a preliminary survey of these public water systems. A list of these public water supply systems provided by the State of Florida Department of Health is contained in Appendix G.

Section 3

Existing Water Supply Facilities

3.1 Water Supply Wellfields (Sources of Water)

The MDWASD water system is currently served by the previously mentioned three large treatment plants, the new Hialeah Reverse Osmosis (RO) Water Treatment Plant (WTP), and the five (5) smaller treatment plants in the southern portion of Miami-Dade County. The existing water supplies serving these treatment plants originate from two major aquifer systems in Miami-Dade County: the Surficial and the Floridan Aquifer Systems. The Surficial Aquifer System, also known as the Biscayne Aquifer, is the major source of drinking water and occurs at or near the land surface in most of the County, and is the principal water-bearing unit of the Surficial Aquifer System in the region (Causaras, 1987). Groundwater from the Floridan Aquifer (FA) is the drinking water source for the new Hialeah RO WTP.

The 20-Year Water Use Permit (WUP)for Miami-Dade County was approved by the SFWMD Governing Board on November 15, 2007. Subsequent modifications were issued, with the latest one dated July 16, 2012. The water use permit limits the annual allocation to 149,906 million gallons (MG) and the maximum monthly allocation to 13,117 million gallons until the permit expires on December 31, 2030. These allocations are further limited by the wellfield operational plan described in Limiting Condition 27 of the water use permit. A copy of the approved water use permit and limiting conditions is located in Appendix H.

On June 20, 2014 the MDWASD submit an application for modification and extension of the existing WUP. Said modification includes new water demand projections based on 2010 population data and revised alternative water supply and reuse projects.

3.1.1 Wellfields and Capacities

The existing MDWASD water supply system is comprised of eight (8) major Biscayne Aquifer wellfields in the Hialeah-Preston and Alexander Orr, Jr. subareas, twelve (12) Biscayne Aquifer water supply wells located at five individual water systems (formerly Rex Utility District water system) in South Dade County and the ASR wells at the Alexander Orr, Jr. Subarea, as shown in **Table 3-1, Table 3-2** and **Figure 3-1**. Each of the wellfield is described below.

3.1.2 Hialeah-Preston Subarea Wellfields

The Hialeah-Preston WTPs are supplied by four water supply wellfields, shown on **Figure 3-1**. The total designed installed capacity from the four wellfields in the Hialeah-Preston subarea is approximately 295 million gallons per day (MGD). Appendix A provides detailed information about well construction and capacities of the Hialeah-Preston area wellfields.

The new Hialeah RO WTP is supplied by six (6) FA wells, as noted on **Figure 3-2.** The total installed capacity for the six wells is 12 MGD. A total of four (4) additional FA wells wi+ll be constructed with a total capacity of 8 MGD. The City of Hialeah is in the process of bidding the four wells and are scheduled to be completed by April 2015.

In addition to these wellfields, four abandoned wells at a Medley Wellfield have been rehabilitated and would be available on a stand-by basis in the event of an emergency.

Table 3-2 Floridan Aquifer Wellfield Data

Wellfield	Wellfield Data	
	Design Capacity (mgd)	**Number of Wells**
Alexander Orr WTP (use of FA Wells for ASR)(c)		
Southwest	10.00	2
West	15.00	3
Subtotal	25.00	**5**
Hialeah RO WTP (use of FA Wells for RO)		
Hialeah RO (b)(d)	12.00	6
Future Hialeah RO(a)(d)	8.00	4
South Miami Heights WTP (Future use of FA Wells for RO))(c)		
Future South Miami	24.00	7
Existing MDWASD System Total (Floridan Aquifer)	**37.00**	**11**
Future MDWASD System Total (Floridan Aquifer)	69.00	22

(a) Proposed wells
(b) Hialeah RO WTP (Phase 1, 10 mgd by 2015;
(c) Source: MDWASD Water Use Permit No. Re-issue 13-00017-W, July 16, 2012
(d) Source: MDWASD Water Use Permit No. 13-00017-W proposed modification, June 2014

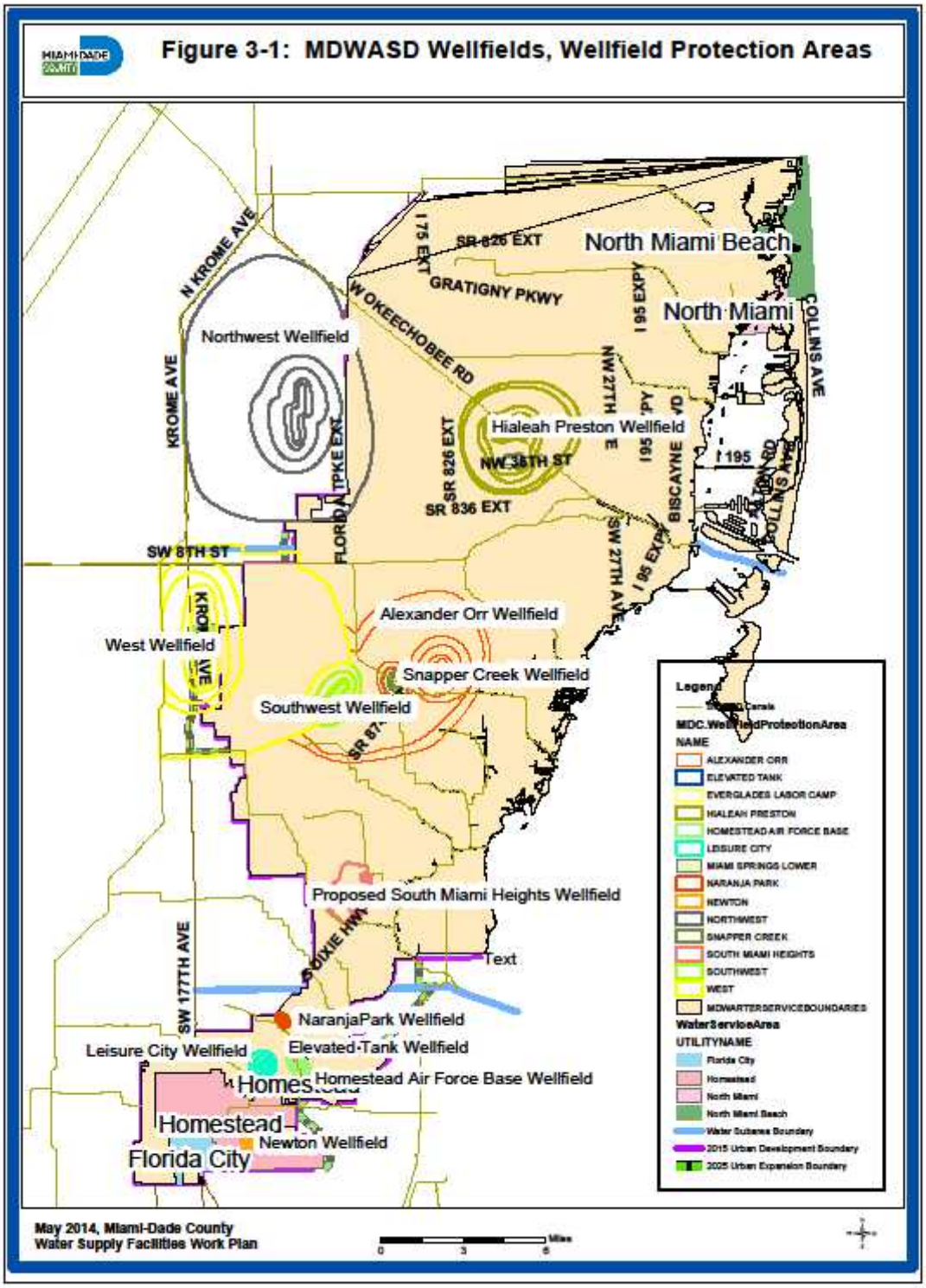


Figure 3-1: MDWASD Wellfields, Wellfield Protection Areas
North Miami Beach
North Miami
Northwest Wellfield
Hialeah Preston Wellfield
Alexander Orr Wellfield
West Wellfield
Snapper Creek Wellfield
Southwest Wellfield
Proposed South Miami Heights Wellfield
NaranjaPark Wellfield
Leisure City Wellfield
Elevated Tank Wellfield
Homestead Air Force Base Wellfield
Homestead
Florida City
Newton Wellfield
N KROME AVE
KROME AVE
W OKEECHOBEE RD
GRATIGNY PKWY
SR 826 EXT
SR 836 EXT
NW 36TH ST
SW 8TH ST
SW 27TH AVE
SW 177TH AVE
COLLINS AVE
BISCAYNE
I 195
I 95 EXP
Legend
NAME
ALEXANDER ORR
ELEVATED TANK
EVERGLADES LABOR CAMP
HIALEAH PRESTON
HOMESTEAD AIR FORCE BASE
LEISURE CITY
MIAMI SPRINGS LOWER
NARANJA PARK
NEWTON
NORTHWEST
SNAPPER CREEK
SOUTH MIAMI HEIGHTS
SOUTHWEST
WEST
WaterServiceArea
UTILITYNAME
Florida City
Homestead
North Miami
North Miami Beach
2015 Urban Development Boundary
2025 Urban Expansion Boundary
May 2014, Miami-Dade County
Water Supply Facilities Work Plan
Miles

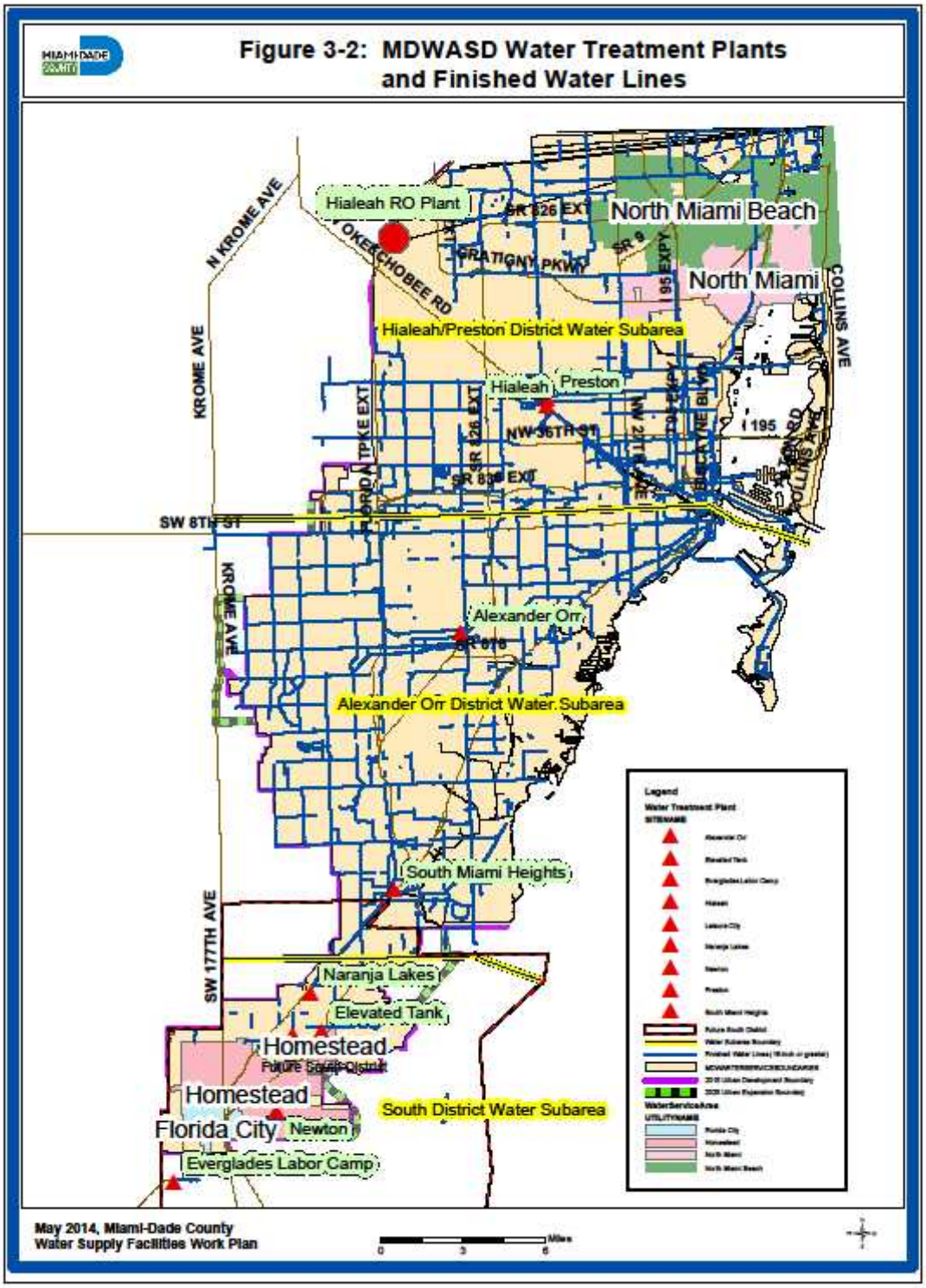


Figure 3-2: MDWASD Water Treatment Plants and Finished Water Lines
Hialeah RO Plant
North Miami Beach
North Miami
Hialeah/Preston District Water Subarea
Hialeah
Preston
Alexander Orr
Alexander Orr District Water Subarea
South Miami Heights
Naranja Lakes
Elevated Tank
Homestead
Homestead
Florida City
Newton
Everglades Labor Camp
South District Water Subarea
N KROME AVE
KROME AVE
SW 8TH ST
SW 177TH AVE
OKEECHOBEE RD
GRATIGNY PKWY
SR 826 EXT
SR 9
I 95 EXPY
COLLINS AVE
SR 826 EXT
NW 36TH ST
NW 27TH AVE
BISCAYNE BLVD
I 195
SR 836 EXT
SR 874
Legend
Water Treatment Plant
SITENAME
Alexander Orr
Hialeah
Hialeah Preston
Hialeah Preston
Naranja Lakes
Newton
Preston
South Miami Heights
Future South District
Water Subarea Boundary
Finished Water Lines (16 inch or greater)
MDWATERSERVICEBOUNDARIES
2015 Urban Development Boundary
2025 Urban Expansion Boundary
WaterServiceArea
UTILITYNAME
Florida City
Homestead
North Miami
North Miami Beach
May 2014, Miami-Dade County
Water Supply Facilities Work Plan
0
3
6
Miles

Table 3-1 Biscayne Aquifer Wellfield Data

Wellfield	Wellfield	
	Installed Design Capacity	**Number of Wells**
Hialeah-Preston		
Hialeah	12.54	3
John E. Preston	53.28	7
Miami Springs	79.30	20
Northwest[a]	149.35	15
Subtotal	**294.47**	**45**
Medley Wellfield (emergency only)[b]	48.96	4
Alexander Orr		
Alexander Orr	74.40	10
Snapper Creek	40.00	4
Southwest	161.20	17
West	32.40	3
Subtotal	**308.00**	**34**
Existing South Dade		
Elevated Tank[c]	4.32	2
Everglades Labor[d]	5.04	3
Leisure City[c]	4.18	4
Naranja[c]	1.15	1
Newton[d]	4.32	2
Subtotal	**19.01**	**12**
***Proposed South Miami Heights*[e]**		
Former Plant	*4*	*1*
Roberta Hunter Park	*6*	*4*
Subtotal	***10.00***	***5***
Existing MDWASD System Total(Biscayne Aquifer)	**670.44**	**95**
Proposed MDWASD System Total(Biscayne Aquifer)	**680.44**	**100**

(a) Northwest wellfield capacity at 150 mgd when pumps operate at low speed.
(b) Wells in this wellfield had been abandoned. They have been restored with the purpose of using them only during an emergency
(c) Abandoned when SMH WTP on line by 2018
(d) Stand-by when SMH WTP on line by 2018
(e) SMH WTP on line by 2018
Source: MDWASDWater Use Permit No. Re-issue 13-00017-W, July 16, 2012, and proposed modification, June 2014

3.1.2.1 Hialeah Wellfield

The three active wells located in the Hialeah Wellfield were constructed in 1936. Each well is 14 inches in diameter, 115 feet deep and have casing depths of 80 feet. The total wellfield capacity is 12.54 mgd or 8,700 gpm (2,900 gpm for each well).

3.1.2.2 John E. Preston Wellfield

The seven active wells located in the John E. Preston Wellfield were constructed in 1966 and 1972. Each well is 42 inches in diameter, 107 feet deep and have casing depths of 66. The capacity of wells No. 1 through No. 6 is 5,000 gallons per minute (gpm) each and the capacity of well No. 7 is 7,000 gpm. The total wellfield capacity is 53.28 mgd.

3.1.2.3 Miami-Springs Wellfield

The twenty active wells located in the Miami Springs Wellfield were constructed between 1924 and 1954. These wells are 14 inches and 30 inches in diameter, 80 to 90 feet deep and have casing depths of 80 feet. The total wellfield capacity is 79.30 mgd or 55,070 gpm (ranging between or 2,500 and 5,000 gpm for each well).

3.1.2.4 Northwest Wellfield

The Northwest Wellfield has fifteen active wells that were constructed in 1980. The wells are 40 inches and 48 inches diameter and 80 to 100 feet deep, with casing depths ranging from 46 to 57 feet. These wells have two-speed motors. The total nominal capacity of the wells at the low speed flow rate is 149.35 mgd. The capacity of each well, except well No. 10, is 10 mgd at the low speed flow rate. Well 10 have a low speed capacity of 9.35 mgd. The total nominal capacity for the wells at the high speed flow is 220.94 mgd.

3.1.2.5 Medley Wellfield

The Medley Wellfield had previously been abandoned. However, four wells were recently rehabilitated for emergency use only. The wells are 42 inches and 48 inches in diameter and 100 to 115 feet deep, with casing depths ranging from 42 to 48 feet. The total wellfield capacity is 48.96 mgd or 34,000gpm

3.1.2.6 Hialeah RO Wellfield

The Hialeah RO wellfield has six (6) active wells that were contructed in 2012. The wells are 16 and 17-inches in diameter, with depth ranging from 1,452 to 1,490 and casing depths ranging from 1,060 to 1,080 feet. The capacity of each well is 2 mgd. The total capacity of the wellfield is 12 mgd.

3.1.3 Alexander Orr, Jr. Subarea Wellfields

The Alexander Orr, Jr. WTP is supplied by four water supply wellfields as shown on Figure 3-1. The total designed installed capacity from the four wellfields in the Alexander Orr, Jr. service area is approximately 308 mgd. There are Floridan Aquifer wells at two of the wellfields. Appendix A provides detailed information about well construction and capacities, of the Alexander Orr, Jr. area wellfields.

3.1.3 Alexander Orr, Jr. Subarea Wellfields

The Alexander Orr, Jr. WTP is supplied by four water supply wellfields as shown on Figure 3-1. The total designed installed capacity from the four wellfields in the Alexander Orr, Jr. service area is approximately 308 mgd. There are Floridan aquifer wells at two of the wellfields. Appendix A provides detailed information about well construction and capacities, of the Alexander Orr, Jr. area wellfields.

3.1.3.1 Alexander Orr, Jr. Wellfield

The ten active wells located in the Alexander Orr, Jr. Wellfield were constructed between 1949 and 1964. These wells are 16 inches and 42 inches in diameter, 100 feet deep and have casing depths ranging from 40 to 50 feet. The capacity of the wellfield is 74.4 mgd (ranging between 4,170 and 7,500 gpm for each well). In the past, there was some concern about Saltwater intrusion in this wellfield. As a result improvements were implemented to a control structure on the C-2 Canal, which reduced the saltwater intrusion.

3.1.3.2 Snapper Creek Wellfield

The four active wells located in the Snapper Creek Wellfield were constructed in 1976. These wells are 24 inches in diameter, 108 feet deep and have casing depths of 50 feet. The total wellfield capacity is 40.0 mgd or 27,760 gpm (6,940 gpm for each well).

3.1.3.3 Southwest Wellfield

The seventeen (17) active wells located in the Southwest Wellfield were constructed between 1953 and 1997. These wells are 20 inches to 48 inches in diameter, 88 to 104 feet deep and have casing depths ranging from 33 to 54 feet. The total wellfield capacity is 161.20 mgd (ranging between or 4,900 and 7,500 gpm for each well).

3.1.3.4 West Wellfield

The West Wellfield has three wells that were constructed in 1994. The wells are 24 inches in diameter and 70 feet deep, with casing depths of 40 feet. The total wellfield capacity is 32.4 mgd or 7,500 gpm per well. This wellfield is limited by the SFWMD to 15 mgd on either an average or maximum daily basis. Well No. 29 pumpage is limited to 5 mgd; Well No. 30 is limited to 10 mgd; and Well No. 31 is to be used as a standby well only to be used with prior written approval from the SFWMD.

3.1.3.5 Floridan Aquifer ASR

Three Upper Floridan Aquifer wells are located in the West Wellfield (WWF) and two are located in the Southwest Wellfield (SWWF). These wells were constructed in 1996 and 1997 and are 30 inches in diameter. The total depth of these wells is between 1,200 feet and 1,300 feet with casing depths between 835 feet and 850 feet. The total capacity of the West Wellfield wells is 15.00 mgd or 3,500 gpm per well. The total capacity of the Southwest Wellfield wells is 10.08 mgd or 3,500 gpm per well.

MDWASD is cycle testing the ASR wells at the SWWF and WWF. MDWASD anticipates using these wells for storage of fresh Biscayne Aquifer water in the

Floridan Aquifer during the wet season for extraction and use in the dry season. As part of the Underground Injection Control (UIC) ASR permit requirements, MDWASD installed an ultra-violet (UV) light disinfection system at both the SWWF and the WWF to provide treatment of Biscayne Aquifer water prior to injecting in the Floridan Aquifer.

MDWASD operates the ASR system according to Department of Environmental Protection UIC permits. Injected water from the Biscayne Aquifer is from the Biscayne Aquifer water allocation in the 20-year Water Use Permit 13-00017-W for the WWF and the SWWF.

3.1.4 South Dade Subarea Wellfields

The five (5) South Dade WTPs are supplied by five individual water supply wellfields as shown on Figure 3-1. The total designed installed capacity from the five wellfields for the South Dade subarea is 19.01 mgd. Appendix A provides detailed information about well construction and capacities, of the existing South Dade area wellfields. The proposed South Miami Heights Wellfield will serve the South Dade area by December 31, 2018.

3.1.4.1 Elevated Tank Wellfield

The two (2) active wells located in the Elevated Tank Wellfield were constructed in 1982 and 1996. These wells are 12 inches and 16 inches in diameter, 45 to 50 feet deep and have casing depths of 35 and 40 feet. The wellfield's capacity totals 4.32 mgd or 1,500 gpm for each well.

3.1.4.2 Everglades Wellfield

The three (3) active wells located in the Everglades Wellfield were constructed from 2000 to 2001. These wells are 18 inches in diameter, between 50 and 55 feet deep and have casing depths of 40 and 45 feet. The wellfield's capacity totals 5.04 mgd, ranging between or 700 and 1,500 gpm for each well, excluding the three abandoned wells.

3.1.4.3 Leisure City Wellfield

The four (4) active wells located in the Leisure City Wellfield were constructed between 1953 and 1971. These wells are 6 inches and 12 inches in diameter, approximately 30 to 40 feet deep and have casing depths ranging from 25 to 35 feet. The wellfield's capacity totals 4.18 mgd, ranging between or 450 and 1,500 gpm for each well.

3.1.4.4 Naranja Wellfield

The only active well located in the Naranja Wellfield was constructed in 1975. This well is 12 inches in diameter, 40 feet deep and has a casing depth of 35 feet. The wellfield's capacity totals 1.15 mgd or 800 gpm.

3.1.4.5 Newton Wellfield

The two (2) active wells located in the Newton Wellfield were constructed in 2000 and 2001. These wells are 18 inches in diameter, approximately 65 feet deep and have casing depths ranging from 50 to 53 feet. The wellfield's capacity totals 4.32 mgd or 1,500 gpm for each well, excluding two abandoned wells.

3.1.4.6 Future South Miami Heights Wellfield

MDWASD has commenced the design of the South Miami Heights WTP and associated wellfields in the South Dade subarea. Of the five existing WTPs and wellfields in the South Dade subarea, only Everglades and Newton WTPs and wellfields will remain on a stand-by basis The three anticipated wellfields and their capacities are: Former Plant Wellfield, 4.0 mgd; Roberta Hunter Park Wellfield,6 mgd; and South Miami Heights 24 mgd. The future SMHs WTP will have a capacity to produce 20 mgd (max day) finish water using a combination of Floridan and Biscayne raw water.

3.1.5 Other Water Supply Wellfields

3.1.5.1 City of North Miami

The City of North Miami Winson Water Treatment Plant (WTP) is currently supplied exclusively from the Biscayne Aquifer. There are presently eight (8) 12-inch diameter wells, ranging in depths from 56 to 124 feet. They were drilled and put into service in 1962. Two wells are located at the WTP site, and another three pairs are located at three different public parks in the vicinity of the WTP. These wellfields provide water supply to a portion of unincorporated Miami-Dade County in addition to within the City of North Miami municipal boundary.

3.1.5.2 City of North Miami Beach

The City of North Miami Beach Norwood Water Treatment Plant is supplied by sixteen (16) Biscayne aquifer and four (4) Floridan aquifer wells. These wellfields provide water supply to a portion of unincorporated and incorporated Miami-Dade County in addition to within the City of North Miami Beach municipal boundary.

3.1.5.3 City of Homestead

The City of Homestead is currently supplied by six Biscayne Aquifer withdrawal wells, with a current capacity of 15.22 MGD. There are two 16-inch, two 18-inch, and two 20-inch diameter wells, all 60 feet in depth. The Wittkop Park wellfield, in the northwest part of the service area, has 4 wells, and the Harris wellfield, located just east of Federal Highway, US-1, has two wells. These wellfields provide water supply to a portion of unincorporated Miami-Dade County in addition to within the City of Homestead municipal boundary.

3.1.5.4 Florida City

The City of Florida City water treatment plant is supplied by four (4) production wells located on a site adjacent to the treatment plant. There are two (2) 12-inch and two (2) 10- inch diameter wells. All four wells withdraw water from the Biscayne Aquifer.

3.2 Water Treatment/Storage Facilities

The MDWASD water system is based on the three large treatment plants, the Hialeah RO plant and the smaller treatment plants in the extremely southern portion of Miami-Dade County, as shown on **Figure 3-2**.

3.2.1 Hialeah-Preston Water Treatment Plants (WTPs)

The Hialeah and John E. Preston WTPs are located at 200 W. 2nd Avenue and 1100 W. 2nd Avenue, respectively. The adjacent facilities in Hialeah share interconnected source water and finished water storage capacity. These two plants serve the Hialeah-Preston subarea, generally, the service area that lies north of Flagler Street. The two plants have similar treatment processes, which are described separately below.

3.2.1.1 Hialeah Water Treatment Plant

The Hialeah WTP was originally designed in 1924 with a total capacity of 10 mgd. By 1935, the plant's capacity totaled 40 mgd. In 1946, capacity was increased to 60 mgd. Air strippers with a capacity of 84 mgd were added to the treatment process in 1991 to remove volatile organics from the finished water. A 3.2 MG storage reservoir for both the Hialeah and John E. Preston WTPs was also added in 1991. There are plans to rerate and upgrade the Hialeah WTP to a capacity of 70 mgd, if necessary.

The source water for Hialeah WTP is from the Hialeah-Miami Springs Wellfields, supplemented by the Northwest Wellfield. The Hialeah WTP has a current rated capacity of 60 mgd. The treatment process includes lime softening with sodium silicate activated by chlorine, recarbonation, chlorination, ammoniation, fluoridation, filtration, and air stripping. The plant site is relatively small, and is surrounded by residential areas.

3.2.1.2 John E. Preston Water Treatment Plant

The John E. Preston WTP was originally designed as a 60 mgd plant in 1968 and upgraded to 110 mgd in 1980. The plant was rerated to a total capacity of 130 mgd in 1984. The plant reached its present capacity of 165 mgd with another addition in 1988. In 1991, the plant was modified with an air stripping capacity of 185 mgd to remove VOCs. In 2005, the plant process modifications to provide enhanced softening for reduction of color and total organic carbon came on line.

The main source of water for the Preston WTP is from the Northwest Wellfield. The current rated capacity is 165 mgd with a treatment process similar to that of the Hialeah WTP. This includes lime softening with ferric and other coagulant and chemicals added prior to lime for enhanced softening, recarbonation, chlorination, ammoniation, fluoridation, filtration, and air stripping. The Preston plant is also cited in a residential area of Hialeah.

3.2.1.3 Hialeah Reverse Osmosis (RO) Water Treatment Plant

On December 27, 2007, the Miami-Dade County and the City of Hialeah entered into a Joint Participation Agreement (JPA) to design, construct, and operate a water

treatment plant. The JPA specified that the County and the City would be equal partners in funding the project.

The Hialeah RO WTP was released for operation by the Florida Department of Health in November 2013. The Plant is located at 4250 W. 114th Terrace in the City of Hialeah, and is approved to operate at a capacity of 7.5 MGD. An additional capacity of 2.5 MGD is scheduled to be completed by December 31, 2015. The main source of water for the Hialeah RO WTP is the Floridan Aquifer. The Hialeah RO plant is currently in operation serving 50% of its water capacity to the City of Hialeah and 50% to unincorporated areas within the MDWASD's service area.

3.2.2 Alexander Orr, Jr. Water Treatment Plant

The Alexander Orr, Jr. WTP is located at 6800 S.W. 87th Avenue in Miami. The original design capacity was 40 mgd in 1954. This plant has undergone several expansions during the past 50 years. The raw water pumping capacity was increased by 32 mgd to 262 mgd in 1995 with an additional source from the West Wellfield. Additional reservoir and high pressure service capacities were also added to bring the total plant design capacity to 256 mgd. The plant rated capacity is 217.74 mgd.

The Alexander Orr, Jr. WTP receives its source water from the Alexander Orr, Jr. Wellfield, Snapper Creek Wellfield, Southwest Wellfield, and the West Wellfield. The Alexander Orr, Jr. WTP treatment process is similar to the other two major plants utilizing lime softening with activated sodium silicate added prior to lime as a coagulant aid, recarbonation, fluoridation, chlorination, ammoniation, and filtration. Unlike the Hialeah and Preston WTPs, this plant does not utilize enhanced softening or air stripping towers. The Alexander Orr, Jr. WTP can also receive groundwater from five Upper Floridan Aquifer wells located in the West Wellfield and the Southwest Wellfield. Finished water is distributed to a service area generally delineated as south of Flagler Street.

3.2.3 South Dade Water Treatment Plants

In 1985, MDWASD purchased an existing private utility known as the Rex Utility District Water System. Today, this system is referred to as the South Dade Water System. At the time of purchase, the system consisted of six plants and associated wellfields. Since the time of purchase, the Redavo WTP has been taken out of service.

The South Dade Water System is currently made up of five small WTPs that draw groundwater from the 12 wells located at the plant sites. The five small plants serving the South Dade Service Area include Elevated Tank, Everglades Labor Camp, Leisure City, Naranja, and Newton WTPs. These plants are located in the Southern portion of the County as shown on Figure 3-2. The plants utilize in-line disinfection with free chlorine and stabilization with the addition of polyphosphate. The 2013 annual average daily flow (ADF) for the plants is 7.29 mgd. This system serves a population of approximately 46,673 in the Leisure City, Everglades Labor Camp, and Naranja areas excluding the cities of Homestead and Florida City, which provide their own water service. These small treatment plant capacities are limited by the pumping capabilities at each plant.

MDWASD commenced the design of a new South Miami Heights (SMH) WTP in the South Dade subarea. Of the five existing plants in the South Dade subarea, only Everglades and Newton WTPs will remain on a stand-by basis when the SMH WTP comes into service by the end of 2018. The total annual average daily demand for the future South Miami Heights WTP will be approximately 18 mgd.

3.2.4 Other Water Treatment Plants

3.2.4.1 City of North Miami

The City of North Miami Norman H. Winson Water Treatment Plant is located at Sunkist Grove, 12098 NW 11th Avenue, and was commissioned in 1962. The Winsom WTP utilizes lime-softening and is capable of supplying 9.3 MGD of water to consumers, but on average the plant produces 7.7 MGD, or 63 percent of the total demand which is approximately 12.2 MGD. The Winson WTP provides treated water to a portion of unincorporated Miami-Dade County in addition to within the City of North Miami municipal boundary and the Village of Biscayne Park.

3.2.4.2 City of North Miami Beach

The City of North Miami Beach supplies water through the City owned and operated Norwood-Oeffler Water Treatment Plant, located on the northeast corner of NW 191st Street and NW 9th Avenue. The Norwood-Oeffler Water Treatment plant, originally constructed in 1953, is a lime-softening water treatment facility. The plant was upgraded in 2007 to include membrane treatment of raw water from the Biscayne and Floridan Aquifers. The treatment now consists of blending of lime softening and nanofiltration of Biscayne Aquifer water with reverse osmosis for the Floridan Aquifer water. The treated water is stored in two above-ground storage tanks at the Norwood-Oeffler WTP prior to being pumped into the City's water transmission and distribution system. The Water Treatment Plant is currently permitted by the South Florida Water Management District (SFWMD) to withdraw 26.31 mgd of raw water from the Biscayne Aquifer and 12.07 mgd from the Floridan Aquifer The treatment plant has an approved capacity of 32 mgd. The WTP provides treated water to a portion of unincorporated and incorporated Miami-Dade County in addition to within the City of North Miami Beach municipal boundary.

3.2.4.3 City of Homestead

The City is supplied by two water treatment plants. The Wittkop Park plant is located at 505 NW 9th Street, and is supplied by four Biscayne Aquifer wells with a capacity of 11.2 MGD. The Harris Field water treatment plant is located at 1084 NE 8th Street. This plant is supplied by two Biscayne Aquifer wells, and has a capacity of 5.7 MGD. Both water treatment facilities use chlorination for disinfection, and have a combined capacity of 16.92 MGD. The Wittkop Park and Harris Field WTPs provide treated water to a portion of unincorporated Miami-Dade County in addition to within the City of Homestead municipal boundary.

3.2.4.4 Florida City

The City of Florida City supplies water through a chlorination water treatment facility, with a capacity of 4 MGD. The water treatment plant is located at 461 NW 6

Avenue, adjacent to the City's Loren Roberts Park.

3.2.5 Finished Water Storage

3.2.5.1 Hialeah Preston Subarea

The finished water storage facilities for the Hialeah-Preston subarea consist of both "in-plant" and remote storage facilities. The storage facilities are summarized in **Table 3-3**.

Table 3-3 Hialeah-Preston Finished Water Storage Facilities

Location	Description	Capacity (MG)
Hialeah WTP	Reservoir – Ground Storage	3.0
Hialeah WTP	Clearwell	1.7
John E. Preston WTP	Ground Storage Tank No. 1	9.0
John E. Preston WTP	Ground Storage Tank No. 2	14.0
John E. Preston WTP	Clearwell	1.1
N.W. 20th Street	Ground Storage Tank	7.5
N.W. 36th Street	Ground Storage Tank	5.0
N.W. 67th Street	Ground Storage Tank	8.2
N.W. 30th Street	Ground Storage Tank	2.5
N.E. 79th Street	Elevated Storage Tank	2.0
Carol City	Ground Storage Tank	2.0
	Total Storage	**56.0**

Source: MDWASD Water Facilities Master Plan, 2003 and MDWASD

3.2.5.2 Alexander Orr, Jr. Subarea

The water storage facilities of the Alexander Orr, Jr. subarea consist of a 39-MG ground storage tank located at the WTP site and a 1.6-MG plant clear well.

3.2.5.3 South Dade Subarea

The South Dade Subarea currently has no significant storage facilities. Therefore, the system is very vulnerable to emergency situations.

MDWASD commenced design of the new South Miami Heights WTP in the South Dade subarea. As part of the projects, a 5 MG reservoir was constructed in 2012, which is currently operating as a re-pump station, until the WTP is completed.

3.2.5.4 Other Water Suppliers

The City of North Miami has two storage tanks that hold treated water prior to being pumped into the distribution system. The total combined storage capacity of the two tanks is 2.25 million gallons, or 17 percent of the current average daily demand. These storage tanks provide storage of treated water to service a portion of unincorporated Miami-Dade County in addition to within the City of North Miami municipal boundary.

The City of North Miami Beach stores the treated water in two above-ground storage tanks at the Norwood-Oeffler WTP prior to being pumped into the City's water transmission and distribution system. The storage capacities of the tanks are 4.2 and 2.0 million gallons. The City also uses a 2-million gallon remote tank bringing the total storage capacity in the City's water-supply system to 8.2 million gallons. These storage tanks provide storage of treated water to service a portion of unincorporated Miami-Dade County in addition to within the City of North Miami Beach municipal boundary.

The City of Homestead stores the finished water in three elevated storage tanks. After treatment, water from five of the six wells is stored in an elevated water storage tank at either Harris Field (0.5 MG), Wittkop Park (0.5 MG), or the Homestead Motorsports Complex (1.0 MG). Water from Well No. 5 at Harris Field is pumped directly into the system after treatment on an as-needed basis. The combined capacity of the storage tanks is 2 MG. These storage tanks provide storage of treated water to service a portion of unincorporated Miami-Dade County in addition to within the City of Homestead municipal boundary.

Florida City has one storage tank that holds treated water prior to distribution within its service area. The tank's storage capacity is 0.5 million gallons.

3.3 Water Distribution Facilities

The MDWASD water distribution system is currently supplied by three regional treatment plants ,five (5) smaller treatment plants located in the southern portion of Miami- Dade County, and the Hialeah RO WTP. The distribution systems serving these treatment plants are comprised of loops and are interconnected, as shown on Figure 3-2.

3.3.1 Hialeah-Preston Subarea

Finished water from the Hialeah and John E. Preston WTPs is pumped through a system of dedicated low-pressure pipelines to remote storage tanks and pumping facilities. This system provides water service to the southeastern part of the Hialeah-Preston subarea. The low pressure system starts at the Hialeah WTP with a 42-inch diameter main heading due east along N.W. 62nd Street, and 36-inch and 42-inch diameter mains running southeast along Okeechobee Road then parallel to the Miami River. The main on N.W. 62nd Street connects to the N.W. 67th Street pumping station, which pumps the water to the south through a 30-inch diameter main running along N.W. 10th Ave. The 30-inch diameter main continues south and connects into the N.W. 36th Street pumping station. This main continues further south and connects into the golf ground pump station.

The 36-inch and 42-inch diameter mains combine into a 54-inch diameter main at N.W. 42nd Avenue. They split again into a 36-inch and a 42-inch diameter main at N.W. 32nd Avenue. These mains connect to the 30th Avenue pump station. The 30th Avenue pump station feeds two 36-inch diameter mains that connect to the 20th Street pumping station to complete the loop. The pipe loop is made predominantly of concrete and cast iron pipes that were installed in the early 1930s. Some segments of this loop

having been in service for more than 60 years. Replacement of these pipes are scheduled in the MDWASD maintenance program.

The remaining part of this subarea is served by a high pressure system. Water is pumped into the system by five high service in-plant pumps with a total capacity of 34.1 mgd at 167 feet total dynamic head (TDH). The high pressure system delivers water service to Hialeah, Miami Springs, and a high pressure main connected to the City of Miami. The northern section of the subarea is supplied by one major piping loop. The loop begins at the plant with a 72-inch diameter main heading north along West 2nd Avenue, next it turns west at West 20th Street, and then it turns North along West 4th Avenue to NW 191st Street. At this location, it turns east until it reaches N.E. 18th Avenue. It then turns south and connects into a 54-inch diameter main that connects to the N.W. 67th Street pumping station.

The southwestern portion of the subarea is supplied by a 36-inch diameter main that connects to the 54-inch diameter main heading out of the John E. Preston WTP at West 25th Street. The main heads west on N.W. 74th Street then turns south on N.W. 107th Avenue. It eventually interconnects with the Alexander Orr, Jr. subarea piping network on S.W. 56th Street around S.W. 117th Avenue.

3.3.2 Alexander Orr, Jr. Subarea

The distribution system of the Alexander Orr, Jr. subarea is comprised of two major piping loops. The first major loop traverses the south and west portion of the subarea. The loop starts at the WTP with a 60-inch diameter main heading west on S.W. 64th Street and a 48-inch diameter main that runs south along S.W. 87th Avenue (Galloway Road) until S.W. 216th Street. The 48-inch diameter main then heads west along S.W. 216th Street to a tee connection at S.W. 127th Avenue. One branch of the tee runs north on S.W. 127th Avenue to S.W. 184th Street and then turns west to 137th Avenue. The 48-inch diameter main travels north on 137th Avenue to S.W. 152nd Street, where it connects into a 24-inch diameter main running east-west on 152nd Street and a 36-inch diameter main that continues north on 137th Avenue to S.W. 120th Street. There, the 36-inch diameter main turns west, then runs north along Hammocks Boulevard to S.W. 88th Street where it reduces to a 24-inch diameter main that runs north along S.W. 152nd Avenue to 72nd Street. The 24-inch diameter main then runs east-west on S.W. 72nd Street. At S.W. 147th Avenue, it connects with a 36-inch diameter main that runs north to S.W. 56th Street (Miller Road), where it connects with a 42-inch diameter main that runs east on Miller Road. This 42-inch diameter main enlarges to a 48-inch diameter main that eventually connects to the 60-inch diameter main at the intersection of Miller Road and S.W. 117th Avenue to complete the loop. A 36-inch diameter main branches off of the 60-inch diameter main at the intersection of Miller Road and S.W. 117th Avenue. This 36-inch diameter main heads north along S.W. 117th Avenue and eventually interconnects the Alexander Orr, Jr. and the Hialeah-Preston subareas.

The second loop starts at the WTP with two 48-inch diameter mains. One main runs north on S.W. 87th Avenue (Galloway Avenue) to S.W. 40th Street (Bird Road) and then turns east. The main continues east along Bird Road, reduces to a 42-inch

diameter main at N.W. 57th Avenue, then connects through a 30-inch diameter pipe connection with the second 48-inch diameter main at Bird Road and S.W. 37th Avenue (Douglas Road). The second 48-inch diameter main travels along Highway 874 to S.W. 56th Street, where it turns east then northeast between S.W. 67th Avenue and S.W. 62nd Avenue to S.W. 48th Street. The main runs east on S.W. 48th Street then northeast through several changes in direction, where it connects to the other 48-inch diameter main at Bird Road and S.W. 37th Avenue. The main then travels north along South Dixie Highway and eventually interconnects with the Hialeah-Preston Service Area piping network through a 36-inch diameter pipe that runs along S.W. 2nd Avenue.

3.3.3 South Dade Subarea

The South Dade water distribution system consists of small water mains with diameters ranging from 16 inches to 4 inches. The distribution system is centered around each individual WTP. Each has its own sets of water main loops within the distinct service areas. The Leisure City, Elevated Tank, and Naranja WTPs, however, are so well interconnected that they can be generally considered as one distribution area. More than 63 percent of the South Dade subarea is served by these three plants. The distribution system of these three plants form one major loop that is bounded on the north by S.W. 248th Street, on the south by S.W. 304th Street, on the east by S.W. 117th Avenue, and on the west by S.W. 172nd Avenue.

The Everglades Labor Camp WTP serves a small area that is bounded on the north by S.W. 376th Street, on the south by S.W. 384th Street, on the east by S.W. 192nd Avenue, and on the west by S.W. 194th Path. This distribution system consists of one 12-inch-diameter loop around the service area interconnected with several 8-inch diameter distribution mains. The Everglades Labor Camp and the Newton WTP distribution system are interconnected via an 8-inch diameter main that runs east along S.W. 376th Street then heads north on S.W. 187th Avenue, where it connects with a 12-inch diameter main at S.W. 360th Street. The 8-inch diameter main continues north on S.W. 187th Avenue until S.W. 352nd Street, where it connects into a small distribution loop that terminates with a 16-inch diameter stub-out.

The Newton WTP distribution system consists of a single 12-inch diameter water main that runs east and west on S.W. 336th Street. The eastbound main then branches north and south along S.W. 152nd Avenue. The southbound branch then turns east on S.W. 344th Street and ultimately connects to the FP&L Turkey Point generating plant. The northbound branch continues along S.W. 152nd Avenue, where it connects to the Leisure City WTP distribution system at S.W. 304th Street. A 6-inch diameter main running south from SW 288th Street on S.W. 137th Avenue then east on S.W. 328th Street connects to an 8-inch diameter main that runs south on 117th Street. This 8-inch diameter main connects to the 12-inch diameter main to FP&L Turkey Point generating plant. This main ultimately completes the interconnection of the Newton WTP with the Leisure City, Elevated Tank, and Naranja WTPs' distribution areas.

The westbound branch of the 12-inch diameter main turns south on S.W. 162nd Avenue then heads south and west on Palm Drive. The main then continues south on S.W. 167th Avenue then west on S.W. 360th Street until it connects to the Everglades Labor Camp WTP 8-inch diameter main that runs north on SW 187th Avenue.

The South Dade distribution system is interconnected with the Alexander Orr distribution system in the vicinity of SW 127th Avenue. MDWASD commenced the construction and operation of the South Miami Heights WTP and associated wellfields in the South Dade Subarea. Of the five exsisting WTPs and wellfields in the South Dade area, only Everglades and Newton WTPs and wellfields will remain on a stand-by service when the SMHWTP comes on line by 2018. MDWASD will be constructing a water main to interconnect with the Everglades and Newton Systems to provide water and meet additional future demands. The SMHWTP will connect to the existing distribution systems of the South Dade Plants to be taken out of service by 2018, when SMHWTP comes online.

3.3.4 Other Water Distribution Facilities

3.3.4.1 City of North Miami

The City of North Miami's distribution system consists of two 16-inch and one 12-inch diameter ductile iron pipes. The two 16-inch diameter pipes mostly service the areas east of the WTP. One of the 16-inch pipes eventually connects to a 20-inch pipe and then to two 12-inch pipes. The 20-inch and one of the two 12-inch pipes connects o a large 30-inch transmission main at different points. This 30-inch pipe serves as the main transmission line on the far-east side of the City. The other 16-inch main reduces to a 12-inch pipe. The 12-inch transmission main leaving the WTP travels west, then south, and expands into the distribution system. The City also maintains seven supply interconnections with MDWASD and a emergency interconnections with the City of North Miami Beach and City of Opa-Locka. This distribution system provides treated water to service a portion of unincorporated Miami-Dade County in addition to within the City of North Miami municipal boundary.

3.3.4.2 City of North Miami Beach

The City of North Miami Beach distribution system provides treated water to service a portion of unincorporated Miami-Dade County in addition to within the City of

North Miami Beach municipal boundary from the WTP.

The City has eleven high service pumps that deliver finished water to the distribution system at approximately 60 to 80 psi and have a combined capacity of 45 mgd with largest one pump out of service. The City's distribution system is fed by 18-inch, 24-inch, and 36-inch diameter transmission mains.

3.3.4.3 City of Homestead

The City's water distribution system is comprised of an interconnected string of mains ranging from 2-inches to 24-inches in diameter, mostly of ductile iron pipe. The water from the storage tanks flows into the mains, with a pressure of 45 to 60 psi.

On July 9, 2010, the City of Homestead entered into a 20-year water wholesale agreement with MDWASD to purchase up to 3 MGD of water to meet the demands of its retail customers. The interconnection between the City and MDWASD occurs at SW 137th Avenue and SW 288th Street. ?????

3.3.4.4 Florida City

Florida City's water distribution system is comprised of an interconnected string of mains ranging from 2-inches to 16-inches in diameter, mostly of ductile iron pipe. The City's distribution system provides service within its municipal boundaries..

3.4 Summary

As shown within this section, the MDWASD water supply and treatment systems have sufficient installed capacity to produce more potable water than is currently required. The supply capacity and treatment capacity are 724.44 MGD and 517.19 MGD respectively. **Table 3-4** summarizes this information. **Table 3-5** summarizes other suppliers facilities capacities.

The capacities of these water supply and treatment systems have been coordinated with future demands and allocations. Sections 4 and 5 of this Work Plan address future demands and required water supply facilities.

Table 3-4 MDWASD Facilities Capacities

Facility	Installed Capacity (mgd)
Hialeah-Preston Water Treatment Plants	60 + 165 = **225**
Hialeah-Preston Well fields	
Preston	53.28
Hialeah	12.54
Miami Springs	79.30
Northwest[a]	149.35
Medley Wellfield [b]	48.96
Hialeah RO Water Treatment Plant	**10**
Hialeah RO Wellfield (Floridan Aquifer)	
Existing Hialeah RO	12.00
Future Hialeah RO (2015)	8.00
Alexander Orr Water Treatment Plant	**248**
Alexander Orr Well fields	
Orr Plant	74.40
Snapper Creek	40.00
Southwest	161.20
West	32.40
South Dade Water Treatment Plants	**14.19**
South Dade Wellfields	
Elevated Tank	4.32
Everglades Labor Camp	5.04
Leisure City	4.18
Naranja	1.15
Newton	4.32
Future South Miami Heights Water Treatment Plant (2018)	***20.00***
Future South Miami Heights Wellfields	
Former Plant (Biscayne Aquifer)	*4.00*
Roberta Hunter Park (Biscayne Aquifer)	*6.00*
South Miami Heights RO (Floridan Aquifer)	*24.00*
Existing WASD Wellfield Total	**682.44**
Existing WASD Water Treatment Plant Total	**497.19**
Future WASD Wellfield Total	**724.44**
Future WASD Water Treatment Plant Total	**517.19**

(a) Northwest wellfield capacity at 150 mgd when pumps operate at low speed.

(b) Wells in this wellfield had been abandoned. They have been restored with the purpose of using them only during an emergency.
Source: MDWASD Water Use PermitNo. 13-00017-W, revised July 2012 , and requested revision June 2014.

Table 3-5 Other Suppliers' Facilities Capacities

Facility	Installed Capacity (mgd)
City of North Miami	
Norman H. Winsom Water Treatment Plant	9.30
City's well fields (8 wells)	**14.96**
City of North Miami Beach	
Norwood-Oeffler Water Treatment Plant	**32.00**
City of North Miami Beach Wellfields	
Biscayne Aquifer Wellfields	27.90
Floridan Aquifer Wellfields	12.07
City of North Miami Beach Wellfields	**39.97**
City of Homestead	
Wittkop Park – Harris Field Water Treatment	11.2+5.7=**16.9**
City of Homestead Wellfields	
Wittkop Park	11.23
Harris Field	5.76
City of Homestead Wellfields	**16.99**
Florida City	
Florida City Water Treatment Plant	***4***
Florida City Wellfields	***4***

Source: City of North Miami Beach SFWMD Water Use Permit Staff Report (August 2007) and Water Use Permit No. Re-issue 13-00060-W, Draft Water Supply Facilities Work Plan (City of North Miami, March 2008), Information provided by discussions with staff for the City of Homestead and Florida City

Section 4
Population and Water Demand Projections

This section presents historical and projected population projections from Year 2010 through Year 2033 for MDWASD's service area. Population data were obtained from the Miami-Dade County Department of Regulatory and Economic Resources (RER), Planning Division, based on the 2010 Census and derived from Transportation Analysis Zone (TAZ), On June 20, 2014, MDWASD submitted an application for modification and extension of the 20-year Water Use Permit (WUP) No. 13-00017-W. The modification and extension to the current WUP are a result of revised population projections based on the 2010 Census and the continued successful implementation of the County's Water Conservation Plan. The requested modification to the WUP included new population data, revised water demand projections and alternative water supply projects to support water demands through the year 2033. MDWASD's Reuse projects were listed but they are not required to address water supply. The revised population projections for the year 2030 are consistent or slightly lower, than the projections in the District's Lower East Coast Water Supply Update, dated October 2013.

4.1 Historical Population

Historical populations served by the MDWASD system are shown in **Table 4-1** in one year increments from Year 2010 to Year 2013. The population in MDWASD's service area grew approximately 2.8% between Year 2010 and year 2013. Table 4-1 also provides a summary of historical population within Miami-Dade County. The MDWASD system served approximately 86% of the County total population in 2013.

Table 4-1 Historical Population Served by MDWASD

YEAR	TOTAL MDWASD	TOTAL COUNTY
2010	2,160,138	2,496,435
2011	2,181,073	2,523,474
2012	2,202,008	2,550,513
2013	2,222,944	2,577,552

Source: Miami-Dade County RER, Planning Division, 2010 Census TAZ data

4.2 Population Projections

Population projections for MDWASD's service area in five year increments from Year 2014 to 2033 are shown in **Table 4-2**. Overall, the population served by MDWASD is expected to increase approximately 17.78% from Year 2014 to Year 2033.

Table 4-2 Population Projections to be Served by MDWASD

Year	Total MDWASD	Total* County
2014	2,243,879	2,604,590
2015	2,266,092	2,631,629
2020	2,370,769	2,766,823
2025	2,475,446	2,902,018
2030	2,580,123	3,037,212
2031	2,601,058	3,064,251
2032	2,621,994	3,091,289
2033	2,642,929	3,118,328

Sources: *Miami-Dade County RER, Planning Division, 2010 Census TAZ Data

Upon completion of the New South Miami Heights Water Treatment Plant by 2018, the South-Dade subservice area boundary will be shifted northward such that portions of the population currently within the Alexander-Orr subarea will be within the South Dade subarea. **Figure 4-1** illustrates the boundary shift. The boundary shift will cause a general redistribution of service between the Alexander-Orr and South Dade areas, but will not have other effects on the population expected to be served by MDWASD. In 2033, MDWASD will serve potable water to approximately 85% of the total County population.

4.3 Historical Water Use

Historic water use figures reflect water provided by the Hialeah-Preston, Alexander-Orr, Everglades, Leisure City, Newton, Elevated Tank, and Naranja WTPs and associated wellfields. These water use figures provide the basis for forecasting future water demands for MDWASD's service area.

Table 4-3, referred to as Table F in previous submittals to the SFWMD**,** provides the historical raw and finished water use for Year 2004 through Year 2013. Information shown in Table 4-3 includes per capital annual average and maximum month water use.

4.4 Water Demand Projections

The water demand projections presented herein are based on an initial system-wide finished water daily per capita use rate of 137.2 gallons per capita per day (gpcd). The per capita use was determined by taking a 3-year average from 2011 to 2013. The initial per capita rate has declined due to water use reductions resulting from water conservation and reuse irrigation water projects. **Table 4-4,** referred to as Table G in previous submittals to the SFWMD**,** provides the projected raw and finished water use for Year 2014 through Year 2033. Table 4-4 also provides projected raw water pumpage from the Biscayne and Floridan Aquifers in five-year increments to indicate how the sources of water will be used to meet future demand.

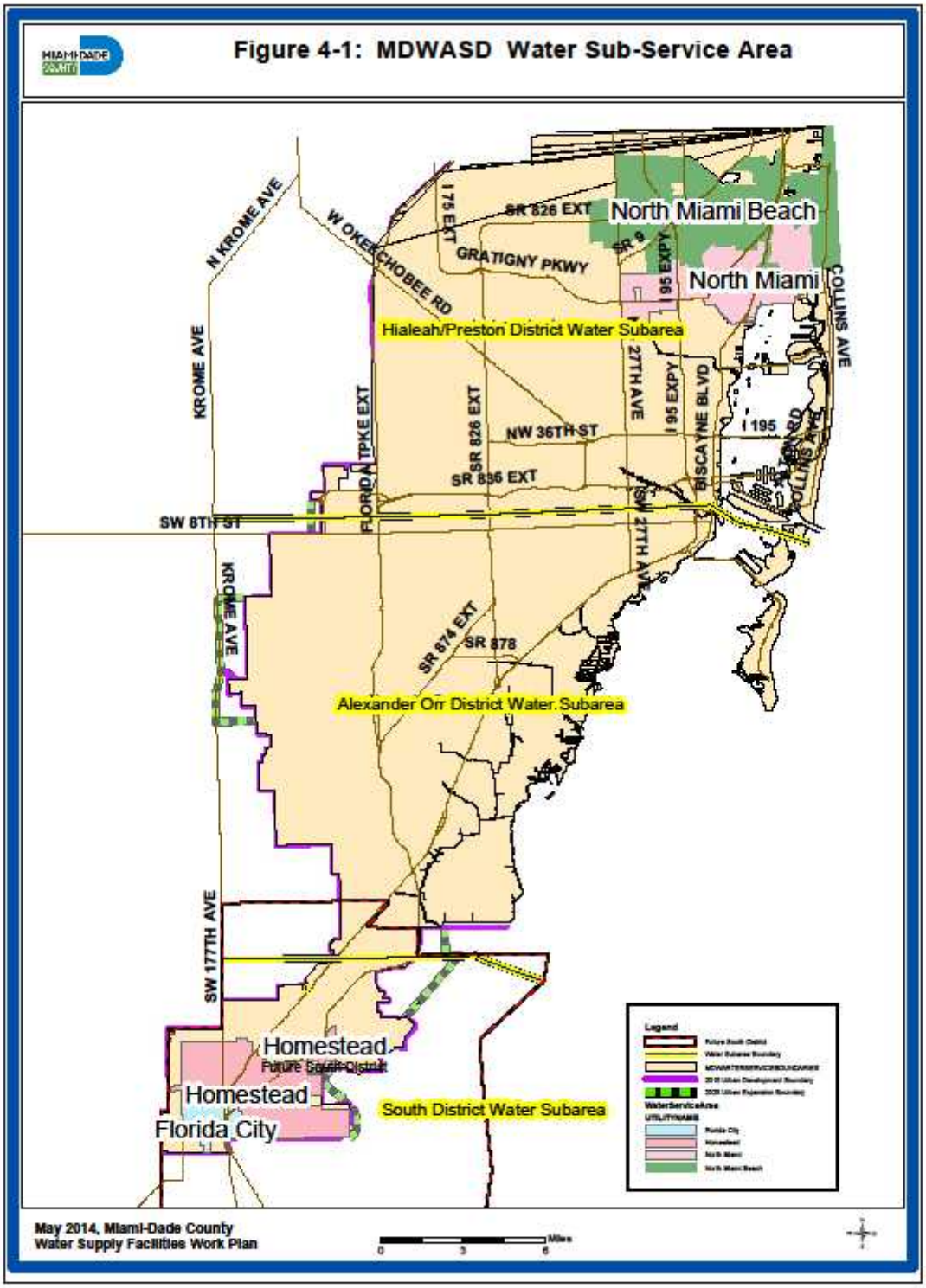


Figure 4-1: MDWASD Water Sub-Service Area
North Miami Beach
North Miami
Hialeah/Preston District Water Subarea
Alexander Orr District Water Subarea
South District Water Subarea
Homestead
Future South District
Homestead
Florida City
N KROME AVE
W OKEECHOBEE RD
I 75 EXT
SR 826 EXT
GRATIGNY PKWY
SR 9
I 95 EXPY
COLLINS AVE
KROME AVE
FLORIDA TPKE EXT
SR 826 EXT
NW 36TH ST
27TH AVE
I 95 EXPY
BISCAYNE BLVD
I 195
SR 836 EXT
SW 8TH ST
SW 27TH AVE
KROME AVE
SR 874 EXT
SR 878
SW 177TH AVE
Legend
May 2014, Miami-Dade County
Water Supply Facilities Work Plan
Miles
0
3
6

TABLE 4-3 (September 2014) Miami-Dade Water and Sewer Department (MDWASD) Past Water Use (2004-20013)

1	2	3	4	5	6	7	8	9	10	11	12	13
FINISHED WATER HISTORICAL USE							**RAW WATER HISTORICAL USE [(a)]**					**Ratio Finished:Raw (Total Annual Use)**
Year	**Population Served ***	**Per Capita Usage (gpcd)**	**Total Annual Use (MG)**	**Average Month Use (MG)**	**Max Month Use (MG)**	**Ratio Max : Aver. Month**	**Per Capita Usage (gpcd)**	**Total Annual Use (MG)**	**Average Month Use (MG)**	**Max Month Use (MG)**	**Ratio Max : Aver. Month**	
TOTAL MDWASD WATER SYSTEM SERVICE AREA **												
2004	2,090,099	162.5	124,301	10,358	10,861.1	1.05	165.6	126,685	10,557	11,063	1.05	1.019
2005	2,101,772	161.8	124,098	10,342	10,734.8	1.04	165.1	126,670	10,556	11,031	1.04	1.021
2006	2,113,445	161.6	124,677	10,390	10,988.6	1.06	164.7	127,019	10,585	11,170	1.06	1.019
2007	2,125,118	150.3	116,602	9,717	10,485.4	1.08	151.6	117,585	9,799	10,648	1.09	1.008
2008	2,136,791	138.1	108,029	9,002	9,583.0	1.06	149.4	116,820	9,735	10,508	1.08	1.081
2009	2,148,464	142.3	111,627	9,302	9,662.7	1.04	151.2	118,575	9,881	10,550	1.07	1.062
2010	2,160,138	141.4	111,453	9,288	9,700.0	1.04	151.0	119,056	9,921	10,346	1.04	1.068
2011	2,181,073	140.2	111,585	9,299	9,597.6	1.03	149.2	118,768	9,897	10,273	1.04	1.064
2012	2,202,008	134.8	108,626	9,052	9,693.9	1.07	142.5	114,807	9,567	10,223	1.07	1.057
2013	2,222,944	136.5	110,388	9,199	9,483.7	1.03	144.6	117,623	9,802	10,252	1.05	1.066
3-year Average (2011-2013)	-	137.2	-	-	-	1.04	145.4	-	-	-	1.05	1.062

* Source of Population Information: Miami-Dade County RER Planning Division. Historic Population 2001 to 2009 adjusted (downward) based on, and 2010 to 2013 represents the 2010 TAZ population projections by the MDC RER Planning Division, based on 2010 Census.

** For 2004 - 2007 from MDWASD Raw & Finished Water Historical Data, For 2008 - 2013 from MDWASD reports to SFWMD of Water Treatment Plant Influent & Effluent Flow Meter Flows

(a) Raw-to-finished water ratio is 1.06. MDWASD is improving its raw water metering/accounting system.

TABLE 4-4 (September 2014)
MDWASD PROJECTED FINISHED WATER DEMANDS

1	2	3	4	5	6	7	8	9
Year	PROJECTIONS (2013) FOR MDWASD SERVICE AREA							
	Pop.[a]	Finished Water Use (gpcd)	AADD Finished Water Use[b] (MGD)	Water Conservation[c] (MGD) Credit	Reuse/ Reclaimed Water [d] (MGD) Credit	Adjusted Finished Water Demand[e] (MGD)	Adjusted Finished Water Use (gpcd)	CITY OF HOMESTEAD Finished Water Demand (MGD)
System-Wide								
2014	2,243,879	137.2	307.19	1.36	0.00	306.43	136.56	2.50
2015	2,266,092	137.2	310.84	2.04	0.00	308.80	136.27	3.00
2020	2,370,769	137.2	325.20	5.44	0.00	319.76	134.88	3.00
2025	2,475,446	137.2	339.56	8.84	0.00	330.72	133.60	3.00
2030	2,580,123	137.2	353.92	9.55	0.00	344.37	133.47	3.00
2031	2,601,058	137.2	356.79	9.55	0.00	347.24	133.50	3.00
2032	2,621,994	137.2	359.66	9.55	0.00	350.11	133.53	3.00
2033	2,642,929	137.2	362.53	9.55	0.00	352.98	133.56	3.00

Footnotes

(a) Population Served represents the TAZ population projections based on 2010 Census Data provided by the MDC RER Planning Division.

(b) Annual Average Daily Demand (AADD) Finished Water Projections between 2014 and 2033 assume 137.2 gpcd (a decrease from 145.4 gpcd total water system demand prior to application of credits (e.g. conservation).

(c) MDWASD has implemented a 20-year water use efficiency plan and is experiencing reductions in per capita water consumption. Water Conservation projections were revised based on the 2010 Annual Water Conservation Plan Conserve Florida Report (March 2011). Real losses in non-revenue water (e.g. unaccounted-for-water) are assumed to remain at less than 10%. The conservation amounts experienced through 2010 (6.54 MGD) were deducted from the 20-year conservation amount in the Conserve Florida Report and the remaining conservation amounts were distributed for the balance of the 20-year period (2011-2027).

(d) Not Used

(e) Adjusted after taking credit in finished water demand projections for reductions in finished water use associated with water conservation.

4.5 Water Conservation and Reuse

4.5.1 MDWASD

4.5.1.1 Water Conservation

The per capita usages contained in Table 4-4 are adjusted taking into consideration MDWASD water conservation. MDWASD is implementing a 20-year water conservation plan and is implementing ways for reducing non-revenue water. The *MDWASD 20-year Water Use Efficiency Goal Based Plan* (Plan) was approved by the SFWMD in May 2007. The Water Conservation projections included in Table 4-4 were revised based on the *2010 Annual Water Conservation Plan Conserve Florida Report* (March 2011). Included in the 20-year Plan is the Water Conservation Best Management Practices (BMP) Planning Spreadsheet prepared by Malcolm Pirnie, Inc. in 2007. Table 5: Countywide BMP Implementation Schedule, Costs, and Savings Projections from *The Water UseEfficiency 5-Year Plan* is located in Appendix E. Currently, MDWASD is implementing all BMPs included in the Plan. Additionally, Miami-Dade County has enacted water use efficiency-legislation including permanent landscape irrigation restrictions, landscape ordinances requiring Florida Friendly landscaping in new construction, in right of ways, and the installation of high efficiency plumbing fixtures in new construction (see Appendix D) and some reuse within the three wastewater treatment plant sites or in their vicinities.

Water conservation activities are funded annually through the operations and maintenance budget and are therefore not included in capital budgets. Values contained within Table 4-4 reflect projections as of June 2014.

Water conservation projections do not reflect water demand reductions presented by the "Unaccounted Water Loss Reduction Plan (February 2007)" prepared by Malcolm Pirnie, Inc. The potential additional reduction in water demands as a result of real non-revenue water loss is estimated at 14.25 mgd over the next ten years.

Water Conservation is in accordance with SFWMD Water Use Permit No. Re-Issue 13-00017-W, Limiting Condition Nos. 45 and 49 and Exhibit 27.

For more information about our Water Conservation Program please go to http://www.miamidade.gov/conservation/home.asp

4.5.1.2 Water Reuse

On June 28, 2013, MDWASD submitted to the Secretary of FDEP the Ocean Outfall Legislation Compliance Plan. A total of 117.5 mgd of reuse will be implemented, out of that 27.6 mgd of reclaimed water will be used to recharge the Floridan Aquifer. The Floridan Aquifer recharge will be applied on equal capacities at the existing Central and South District Wastewater Treatment Plants, and a proposed West District Wastewater Treatment

Plant (9.2 mgd each), and up to 90 mgd of reuse water will be provided to FPL for Turkey Points Units 5, 6 and 7 cooling. The reuse projects and completion dates are listed in Exhibit 14 of the County's 20-year water use permit modification request, included in Appendix F.

The County's projected finished water demands are now markedly lower than anticipated when the first 20-year water use permit application was submitted. This demand reduction has eliminated the anticipated supply shortages which were the basis for an ambitious schedule of several costly alternative water supply projects. As such, reuse to address water supply is no longer required or needed

As noted in Exhibit 14 in Appendix F, MDWASD is currently implementing a total of 16.49 mgd of reuse at each of the Wastewater Treatment Plants. The reclaimed water is used for industrial and public and non-public irrigation.

4.5.2 Other Water Suppliers

4.5.2.1 City of North Miami

The City of North Miami has developed a water conservation plan to help reduce the demand for potable water and lower its consumption on a per capita basis. The conservation plan includes the adoption of Florida friendly landscaping methods, the implementation of a water conservation public education program, the implementation of a leak detection program, water loss prevention programs, and the exploration of the utilization of reuse water for irrigation and non-potable water uses. The City is also implementing an incentives program, and encouraging the development of "green buildings". They will also continue to enforce the wellfield protection ordinance which limits the allowable land uses within the wellfield's cone of influence, and will continue to monitor water quality levels in the drainage basins to maintain a minimum level of service standards. Currently, all the City's wastewater is treated by MDWASD, and therefore the City does not have a water reuse and reclamation program.

4.5.2.2 City of North Miami Beach

The City of North Miami Beach has seen major successes in ways of alerting and educating residents on water and environmental conservation. In 2005, the City created a Water Conservation Program that applies conservation methods to reduce water demand and to lower the per capita consumption of potable water. The program includes collective efforts to increase the overall water use efficiency and to limit water losses to 10 percent or less. They have also initiated a water conservation educational and outreach program. Another aspect of the conservation program is the continuation and installation of water efficient landscape, plumbing and irrigation ordinances, as well as a water shortage and emergency ordinance. In addition, they have begun the use of alternative water sources, mainly the Floridan aquifer. Other methods for water conservation taking

place at the City include meter replacements and a showerhead exchange program.

Also, the North Miami Beach Water fund established the Foundation for Water and Environmental Education which is a not-for-profit organization with funds and programs managed by its own directors and established to maintain and aid water resource management in the City of North Miami Beach community.

4.5.2.3 City of Homestead

The City of Homestead has developed a water conservation plan to reduce potable water consumption. The plan includes a permanent irrigation ordinance which establishes irrigation restrictions prohibiting landscape irrigation between 9:00 AM and 4:00 PM., a Florida Friendly ordinance that promotes use of drought landscape methods, a high efficiency plumbing fixture ordinance that establishes water conservation standards for plumbing fixtures installed in new construction, and a leak detection program. In addition, the City has a residential and commercial meter replacement program where all meters will be replaced within the next 5 years. The City will adopt the Automatic Meter Reading technology which allows the reading of water consumption remotely which will allow accurate and true monthly readings. Also, the City is implementing a rain sensor device ordinance that requires all irrigation systems equipped with automatic controls to have a rain sensor switch which turns off the system when more than 0.5 inches of rain has fallen. A water conservation education program is also taking place.

The City has also implemented a reclaimed water system, where most of the wastewater from the City's sewer service area is treated at the City's Wastewater Treatment Plant (WWTP). The wastewater from the City's WWTP receives treatment (including ultra-violet radiation to eliminate the possible formation of disinfection by- products) and is reused to recharge the surficial aquifer. 100% of the City's WWTP output [approximately 6 MGD (4.730 MGD, average)] is currently recharging the aquifer via two primary and four secondary rapid infiltration trenches.

4.5.2.4 Florida City

Florida City is currently implementing a water main replacement program, where they are abandoning all existing 2, 4 and 6-inch diameter mains and installing new 8 and 12-inch diameter DIP water mains. They are also following the SFWMD restrictions for irrigation water use that are currently in place.

4.6 Summary

In summary, the historically based MDWASD service area projected water demands as adjusted for water conservation and reuse are presented in **Table 4-5** as "adjusted" finished water demand and per capita water use. The resulting

anticipated finished water demands in 5-year increments to 2030, and from 2031-2033 is as follows:

Table 4-5 MDWASD Service Area Incremental Water Demands

Year	Population[a]	Adjusted Finished Water (mgd)	Adjusted Per Capita Water Use (gpcd)
System-Wide			
2014	2,243,879	306.43	136.56
2015	2,266,092	308.80	137.27
2020	2,370,769	319.76	134.88
2025	2,475,446	330.72	133.60
2030	2,580,123	344.37	133.47
2031	2,601,058	347.24	133.50
2032	2,621,994	350.11	133.53
2033	2,642,929	352.98	133.56

Section 5
Planned Water Supply Facilities

This section details the water supply facilities that are planned in order to meet MDWASD's water demands through 2033. The County's projected finished water demands are now markedly lower than anticipated when the first 20-year water use permit application was submitted to South Florida Water Management District (SFWMD) in 2007. This demand reduction has eliminated the anticipated supply shortages which were the basis for an ambitious schedule of several costly alternative water supply projects which are no longer required or needed. Reuse projects to address water supply have been eliminated. The decrease in water demands is a result a successful implementation of the County's Water Conservation Plan and new population projections based on the 2010 Census. For ease of reference, the project start and finish dates have been provided below the title of the following subsections. The Capital Improvement Elements Tables 8 and 12 located in Appendix B.

5.1 Alternative Water Supply Projects

The following proposed alternative water supply (AWS) projects are to meet MDWASD's water demands through 2033, which encompasses the proposed modification to the 20-year Consumptive Use Permit period. AWS projects have been identified to meet water demands in the MDWASD service area and are presented in **Table 5-1, Table 5-2** and **Figure 5-1**.

The plan described herein demonstrates that the proposed projects, by their location, volume of water produced, and timing of implementation, will be sufficient to meet the water demand increases. These projects will undergo further refinement and development over the next few months. The flow (Q MGD) shown in parentheses below represents the corresponding amount of finished water annual average daily demand (AADD) provided by the projects in terms of million gallons per day (MGD). These AWS projects and AADD assume that all current wholesalers will remain on the MDWASD system through 2033.

Table 5-1: MDWASD) Proposed Alternative Water Supply Projects From Alternative Water Supply Project D3evelopment Submitted to SFWMD June 2014

Year	Annual Average Finished Water Quantity in MGD and Source		
2013	7.5	Hialeah Floridan Aquifer RO WTP-Phase 1-a, 10 MGD & 6 Floridan Aquifer supply wells	AWS
2015	2.5	Hialeah Floridan Aquifer RO WTP-Phase 1-b, 4 Floridan Aquifer supply wells	AWS
2018	12.45	South Miami Heights WTP Phase 1(RO portion)	AWS
2030	5.0	South Miami Heights WTP Phase 2(RO portion)	AWS
Total	27.45		

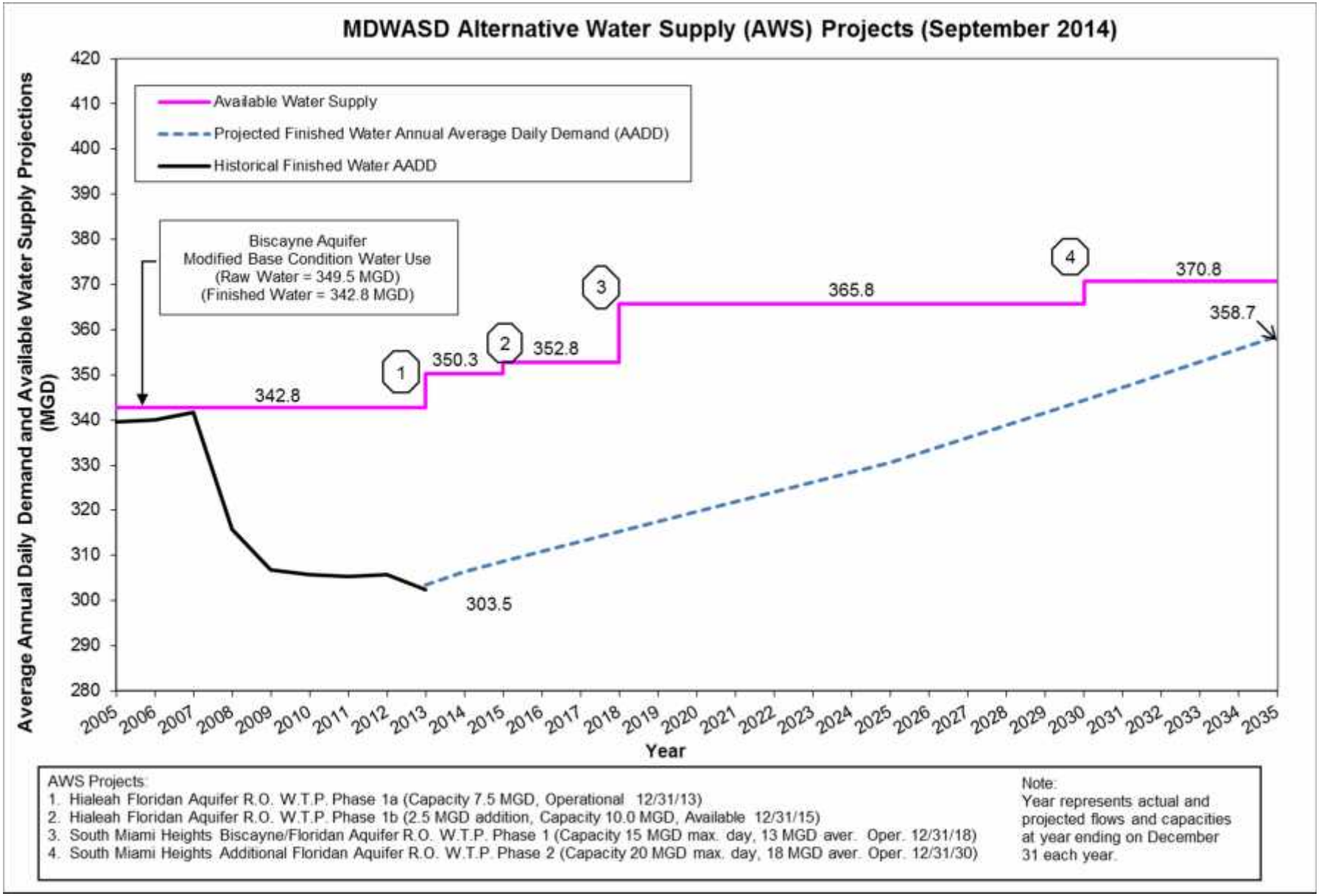
TABLE 5-2 (September 2014)

MDWASD FINISHED WATER DEMAND BY SOURCE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	PROJECTIONS (2013) FOR MDWASD SERVICE AREA								ADJUSTED FINISHED WATER AADD (MGD)								
									Biscayne Aquifer					Floridan Aquifer			
Year	Population[a]	Finished Water Use (gpcd)	AADD Finished Water Use[b] (MGD)	Water Conservation[c] (MGD) Credit	Reuse/ Reclaimed Water[d] (MGD) Credit	Adjusted Finished Water Demand[e] (MGD)	Adjusted Finished Water Use (gpcd)	CITY OF HOMESTEAD Finished Water Demand (MGD)	South Dade[g]		South Miami Heights (SMH) Membrane Softening WTP[i,m]	Hialeah-Preston/ Alexander-Orr Lime Softening (j)	Total Biscayne Aquifer (f)	Hialeah RO WTP[l]	South Miami Heights (SMH) RO WTP[m]	Total Floridan Aquifer	Total All Sources
									Elevated Tank/ Leisure City/ Naranja	Everglades Labor Camp/ Newton[h]							
System-Wide																	
2014	2,243,879	137.2	307.79	1.36	0.00	306.43	136.56	2.50	4.30	4.08	0.00	293.05	301.43	7.50	0.00	7.50	308.93
2015	2,266,092	137.2	310.84	2.04	0.00	308.80	136.27	3.00	4.30	4.10	0.00	293.40	301.80	10.00	0.00	10.00	311.80
2020	2,370,769	137.2	325.20	5.44	0.00	319.76	134.88	3.00	0.00	*4.10*	2.55	297.76	300.31	10.00	12.45	22.45	322.76
2025	2,475,446	137.2	339.56	8.84	0.00	330.72	133.60	3.00	0.00	*4.10*	2.55	308.72	311.27	10.00	12.45	22.45	333.72
2030	2,580,123	137.2	353.92	9.55	0.00	344.37	133.47	3.00	0.00	*4.10*	2.55	322.37	324.92	10.00	12.45	22.45	347.37
2031	2,601,058	137.2	356.79	9.55	0.00	347.24	133.50	3.00	0.00	*4.10*	2.55	320.24	322.79	10.00	17.45	27.45	350.24
2032	2,621,994	137.2	359.66	9.55	0.00	350.11	133.53	3.00	0.00	*4.10*	2.55	323.11	325.66	10.00	17.45	27.45	353.11
2033	2,642,929	137.2	362.53	9.55	0.00	352.98	133.56	3.00	0.00	*4.10*	2.55	325.98	328.53	10.00	17.45	27.45	355.98

See Footnotes on page 5-3

Footnotes
(a) Population Served represents most recent represents the 2010TAZ population projections by the MDC Planning Department.
(b) Annual Average Daily Demand (AADD) Finished Water Projections between 2014 and 2035 assume 137.2 gpcd (a decrease from 145.4 gpcd) total water system demand prior to application of credits (e.g. conservation).
(c) WASD has implemented a 20-year water use efficiency plan and is experiencing reductions in per capita water consumption. Water Conservation projections were revised based on the 2010 Annual Water Conservation Plan Conserve Florida Report (March 2011). Real losses in non-revenue water (e.g. unaccounted-for-water) are assumed to remain at less than 10%. The conservation amounts experienced through 2010 (6.54 MGD) were deducted from the 20-year conservation amount in the Conserve Florida Report and the remaining conservation amounts were distributed for the balance of the 20-year period (2011-2027).
(d) Not Used (TBD).
(e) Adjusted after taking credit in finished water demand projections for reductions in finished water use associated with water conservation.
(f) The Modified Base condition raw water use (349.5 mgd) represents values agreed to by SFWMD and MDWASD and demonstrated by modeling to not cause a net increase in water from the regional canal system. Biscayne Aquifer base condition raw water use allocation of 349.5 mgd (South Dade at 7.1 mgd, North and South at 342.4 mgd) equates to 342.8 mgd of finished water annual average daily demand (AADD).
(g) South Dade (Raw : Finished) Ratio = 1.0 : 1.0
(h) Becomes *stand-by* once SMH WTP starts up. This *stand-by* capacity is not used in the total raw and finished water amounts.
(i) Assumes withdrawals from Elevated Tank, Leisure City, Naranja, Caribbean Park, Former Plant, and Roberta Hunter Park are consolidated. Biscayne Aquifer supplied Membrane Softening (Raw : Finished) Ratio = 1.17 : 1.00 (85% Recovery).
(j) Hialeah-Preston / Alexander-Orr (Raw : Finished) Ratio = 1.060 : 1.00 (Lime Softening)
(k) The values are based on initial cycle testing of the ASR well facilities and the projected seasonal operations of the ASR well facilities at full design capacities with the storing of Biscayne aquifer water during the wet weather months of June through October and the recovery of the stored Biscayne aquifer water during the dry weather months of December through April, assuming an ultimate storage loss of 1.31%.
(l) Floridan Aquifer supplied RO WTP (Raw : Finished) Ratio = 1.333 : 1.00 (75% recovery)
(m) At an ultimate 20 mgd plant operating capacity, the raw water withdrawal would be 3.00 MGD from the Biscayne and 23.27 MGD from the Floridan in accordance with the Wellfield Operation Plan. In order to maintain operational flexibility and protect the nanofiltration membranes (Biscayne supply), MDWASD is requesting that the WTP be allowed to operate with up to a constant supply of 3.0 MGD from the Biscayne aquifer and the rest, to meet demand, be provided from the Floridan aquifer. The full use of the small Biscayne aquifer allocation at SMH supplemented by Floridan aquifer water will allow a blended finished water product that is expected to be lower in sodium and chloride, which will be beneficial to customers on low sodium diets, and more will require less chemical addition for product water stabilization.
(n) An additional 0.82 MGD of Raw Water AADD has been included in year 2033 for Hialeah-Preston / Alexander Orr Lime Softening to maintain the total Biscayne aquifer Modified Base condition raw water use at 349.5 mgd and to provide needed operational flexibility in withdrawals of Floridan aquifer water.


MDWASD Alternative Water Supply (AWS) Projects (September 2014)
Average Annual Daily Demand and Available Water Supply Projections (MGD)
Available Water Supply
Projected Finished Water Annual Average Daily Demand (AADD)
Historical Finished Water AADD
Biscayne Aquifer
Modified Base Condition Water Use
(Raw Water = 349.5 MGD)
(Finished Water = 342.8 MGD)
342.8
350.3
352.8
365.8
370.8
358.7
303.5
1
2
3
4
Year
AWS Projects:
1. Hialeah Floridan Aquifer R.O. W.T.P. Phase 1a (Capacity 7.5 MGD, Operational 12/31/13)
2. Hialeah Floridan Aquifer R.O. W.T.P. Phase 1b (2.5 MGD addition, Capacity 10.0 MGD, Available 12/31/15)
3. South Miami Heights Biscayne/Floridan Aquifer R.O. W.T.P. Phase 1 (Capacity 15 MGD max. day, 13 MGD aver. Oper. 12/31/18)
4. South Miami Heights Additional Floridan Aquifer R.O. W.T.P. Phase 2 (Capacity 20 MGD max. day, 18 MGD aver. Oper. 12/31/30)
Note:
Year represents actual and projected flows and capacities at year ending on December 31 each year.

5.1.1 Hialeah Floridan Aquifer R.O. W.T.P (10 MGD)

A new upper Floridan Aquifer Reverse Osmosis (RO) water treatment plant was constructed in 2013, and is located at 4250 W. 114th Terrace in the City of Hialeah. The WTP was constructed pursuant to a Joint Participation Agreement between the City of Hialeah and the County which was approved by the Board of County Commissioners on July 24, 2007 and called for the design, construction, and operation of a water treatment plant constructed in the annexation area and supplied by the brackish Floridan aquifer to produce initially 10 mgd with the capacity to expand to 17.5 mgd.

Approval from the Florida Department of Health to produce and distribute water was received in November 2013. The WTP utilizes the Floridan Aquifer as the alternative water supply using the RO treatment to remove the salt. The initial operational phase of the Plant is 7.5 mgd, increasing to 10 mgd by the end of 2015 when construction of additional wells is expected to be completed.

5.1.1.1 Hialeah Floridan Aquifer R.O. W.T.P. Phase 1-a (7.5 MGD) Completed 2013

Phase 1-a of the RO WTP included a 10 mgd plant and an initial six (6) Floridan Aquifer supply wells. The phase 1-a cost was about $95 million.

5.1.1.2 Hialeah Floridan Aquifer R.O. W.T.P. Phase 1-b (2.5 MGD)

Start 2014
Finish 2015

Phase 1-b of the RO WTP will consist of the construction of four (4) Floridan Aquifer supply wells for a maximum treatment capacity of 10 mgd. The Phase 1-b cost is estimated at approximately $5 million.

5.1.2 South Miami Heights W.T.P. and Wellfield (20 MGD)- 17.45MGD Floridan Aquifer RO and 2.55 MGD Biscayne Aquifer

Start 2014
Finish 2018

Design of the South Miami Heights Water Treatment Plant (WTP) and Wellfield commenced in 2014. The WTP will be located at 18800 SW 208 Street in Miami. The RO WTP and associated facilities will have a capacity to produce 20 mgd (max day) finished water using a combination of 17.45 mgd from the Floridan Aquifer and 2.55 mgd from the Biscayne Aquifer. Phase 1 will have a maximum capacity of 15 mgd to be operational by December 31, 2018, and Phase 2 will a maximum capacity of 20 mgd, operational by December 31, 2030. A total of five (5) Biscayne Aquifer wells and seven (7) Floridan Aquifer wells are planned to be constructed.

Upon completion of the WTP, the Elevated Tank, Leisure City, and Naranja WTPs will be abandoned and their associated allocations will be transferred to the SMHs

WTP. Everglades Labor Camp and Newton WTPs will remain on stand-by service.

5.2 Miscellaneous Projects

5.2.1 Water Conservation/Non-Revenue Potential Water Loss Reduction Program (Up to 19.62 MGD)

Start 2006
Finish 2027

These projects serve to reduce the demand for water through demand management. They include, but are not limited to, various water conservation projects currently being implemented by MDWASD. The County's Water Use Efficiency Five-Year Plan was approved by the Board and has been expanded to cover the next 20 years with a projected reduction in demand of 19.62 MGD over that time period. Examples of ongoing conservation projects include the bathroom and kitchen retrofits program, Miami-Dade green lodging and restaurant program, , rebates for high efficiency toilets, and landscaping irrigation evaluations for residential, commercial and governmental uses. Similarly, the Non-Revenue Real Water Loss Program identified potential reductions in water demand of as much as 14.25 MGD by 2030 through demand management activities.

5.3 20-Year Work Plan and Capital Improvement Plan

As mentioned in the previous sections, the latest lower population projections based on the 2010 Census results and historically lower per capita daily finish water use have reduced the projected finish water demands which have eliminated the need for other alternative water supply projects by several years. The Alternative Water Supply projects to address water demands through 2033 include the Hialeah RO and South Miami

The projects for the 20-Year Work Plan have been included in the County's Capital Improvement Element. A copy of Table 12 from the County's Capital Improvement Element is contained within Appendix D and summarized in **Table 5-3** for the next 5 years (2014 – 2018).

Table 5-3 MDWASD Water/Alternative Water Supply CIE Projects

Project Name	Expenditure[(a)]						Six Year Totals
	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018	
Water Facilities							
South Miami Heights W.T.P. & Wellfield	17.11	46.20	43.80	5.19	0.00	0.00	112.31
Hialeah Floridan Aquifer R.O.W.T.P. Phase 1 (10.0 mgd)	23.79	4.77	1.34	7.383	4.08	6.09	47.48

Source: MDWASD Adopted FY 2012-2013 budget, (a) Millions of Dollars

5.4 Other Water Suppliers Future Plans

5.4.1 City of North Miami

The City of North Miami's plans for a two-phase expansion of the Winson WTP have been put on hold. The plans entailed a Phase I, to be concluded by 2010, to add an additional 8.5 MGD capacity from a Reverse Osmosis (RO) system. Phase II to add additional membrane treatment to the RO facility, which would create an additional 4.0 MGD capacity. The proposed improvements would total an increase of 12.5 MGD to the capacity of the WTP.

The City also identified that the Floridan aquifer would be the only water resource alternative for the increase in demand. Therefore, the City planned to construct an additional ten Floridan wells to supply the RO Facility. The City planned to add a raw water transmission main from the wells to the WTP.

On hold is also the third expansion plan for the addition of a 5 MG storage tank, to be located on a vacant parcel owned by the City's new Biscayne Landing development. The City may decide to forgo with the construction of the tank and utilize the parcel for another smaller RO Treatment facility or a reuse facility.

These water supply system improvements planned by the City of North Miami will provide water supply for those portions of unincorporated Miami-Dade County which are currently served by the City of North Miami.

The City is currently designing upgrades to the existing facility to maximize its efficiencies.

5.4.2 City of North Miami Beach

The City of North Miami Beach plans to increase the capacity of the its WTP to 35 MGD by 2020 and 38 (MGD) by 2025. These water supply system improvements planned by the City of North Miami Beach will provide water supply for those portions of unincorporated and incorporated Miami-Dade County which are currently served by the City of North Miami Beach.

5.4.3 City of Homestead

The City of Homestead is currently in the process of analyzing the different ways of improving or expanding their systems to increase capacity as the population within its municipal boundary and in parts of unincorporated Miami-Dade County where it provides water increases. The two major alternatives are either upgrading the existing well pumping capacity or installing additional wells. However, the City has not yet agreed on any type of improvements, and therefore no additional information can be provided at this time.

5.4.4 Florida City

Due to the fact that the SFWMD is currently adjusting any further withdrawals from the Biscayne aquifer, the City plans to increase its Water Treatment Plant capacity by installing additional wells and withdrawing water from the Floridan aquifer, which will require membrane filtration treatment and chlorination prior to distribution. The timeline for this expansion is not yet known.

5.5 Conclusion

In conclusion, and as **Table 5-2** shows, MDWASD has prepared a work plan which demonstrates that the Department (e.g. public) facilities are available to meet the projected growth demands (which reflect credits for conservation). The current permit and the limiting conditions are located in Appendix H, and the permit modification request is located in Appendix I.

Section 6
Climate Change and Sea Level Rise Plan

This section details MDWASD evaluation and planning for sea level rise and climate change over the planning horizon in this document. The primary concern to MDWASD water supply is salt water intrusion into the freshwater Biscayne aquifer, the primary source of drinking water in Miami-Dade County. Results of evaluation and data analysis completed to date indicate that within the next thirty years MDWASD will be able to operate its wellfields and water treatment facilities as designed, as groundwater modeling indicates even with a high level of projected sea level rise our wellfields will not be impacted by salt water intrusion. Further modeling is currently underway to extend the planning scenarios fifty years out, and will include climate change such as increases and decreases in annual precipitation, and extreme weather events.

6.1 Introduction

Southeast Florida is one of the most vulnerable regions to the impacts of climate change and sea level rise as a result of our flat topography, porous limestone geology, and dense coastal development. Climate change and sea level rise are expected to present significant challenges relating to water resource planning, management and infrastructure for the counties located in south Florida, including Broward, Miami-Dade, Monroe, and Palm Beach Counties. These counties have agreed to partner in regionally-coordinated climate mitigation and adaptation strategies as part of the Southeast Florida Regional Climate Change Compact and have adopted a Regional Climate Action Plan which highlights "Water Supply, Management, and Infrastructure" as a primary focal area. (http://southeastfloridaclimatecompact.org/). Investigations and evaluations conducted at the national, regional, and local levels have reinforced the need to plan for the predicted impacts of more frequent and severe drought, increases in tidal and storm-related flooding, and the loss of coastal wellfield capacity due to saltwater intrusion. In the absence of proactive planning, these impacts will present liabilities for coastal and inland communities with implications for urban water supplies, water and wastewater infrastructure, and both regional and local drainage/flood control systems. Investments in water supply planning and infrastructure that account for these predicted trends will improve the resilience of our communities, provide public health benefits, and reduce the potential for economic losses.

Miami-Dade County along with Broward, Monroe, Palm Beach Counties, local governments and water utilities in the southeast Florida region have begun to formalize the integration water supply and climate change considerations as part of

coordinated planning efforts, including updates to local government and water utility 10 year Water Supply Facility Work Plan and enhancements to local government's Comprehensive Plans. Key considerations for communities within the four County Compact planning area areas include: 1) sea level rise, 2) saltwater intrusion, 3) extreme weather, and 4) infrastructure investments to support diversification and sustainability of water supply sources, and adaptive stormwater and wastewater systems. Sea level rise produces varied challenges with the respect to water resources sustainability, water management, and water/wastewater facilities and infrastructure. Impacts include salt water intrusion into coastal wellfields, infiltration of groundwater with chloride levels into wastewater collection systems, impairing normal operations and maintenance as well as challenges for beneficial use of reclaimed water as an alternative water supply. Water management systems are also at risk with systems constrained by rising groundwater and canal gate tailwater elevations, which reduce soil storage and discharge capacity, with increased potential for both inland and coastal flooding.

6.2 Miami-Dade County Sea Level Rise and Climate Change Recent Government Action

As part of the Miami-Dade County Evaluation and Appraisal Report adopted in 2011, climate change was identified as one of the priorities to address in the County's Comprehensive Development Master Plan (CDMP). Miami-Dade has incorporated climate change considerations and language in several of the Elements of the CDMP update which was approved by the Board of County Commissioners in October, 2013.

The Miami-Dade Sea Level Rise Task Force was created by Resolution R-599-13 on July 2, 2013 to review the relevant data and prior studies, assessments, reports, and evaluations of the potential impact of sea level rise on vital public services and facilities, real estate, water and other ecological resources, water front property, and infrastructure (http://www.miamidade.gov/planning/boards-sea-level-rise.asp). Their recommendations included in the June 2014 Final Report Recommendation 4:

> *While recognizing the recent efforts to address flood protection and saltwater intrusion by the South Florida Water Management District and the Miami-Dade County, the Sea Level Rise Task Force recommends that Miami Dade County work jointly with the District and the SE Climate Compact partners to conduct a comprehensive study and develop adaptation strategies to address potential flood damage reduction and saltwater intrusion associated with sea level rise. This strategy should expeditiously address rising sea levels, a time frame for implementation, and a potential funding mechanism.*

Miami-Dade Board of County Commissioners adopted in September an ordinance relating to the rules of procedures of the Board of County Commissioners amending Section 2-1 of the Code of Miami-Dade County, Florida, to require that in all agenda items related to planning, design, and construction of county infrastructure a statement be included that the impact of sea level rise has been considered (File 141211 http://www.miamidade.gov/govaction/matter.asp?matter=141211&file=true&yearFolder=Y2014).

6.3 Saltwater Intrusion

Along the coast of southeast Florida, and several miles inland, groundwater supplies and potable wells are vulnerable to saltwater contamination. The Biscayne Aquifer, which serves as the region's primary water supply, is a shallow, surficial aquifer characterized by limestone karst geology which is highly porous and transmissive. Salt water intrusion is defined by the South Florida Water Management District (SFWMD) as chloride concentrations exceed drinking water standards of 250 mg/l. The SFWMD has identified "Utilities at Risk" for salt water intrusion, which include utilities with wellfields near the saltwater/freshwater interface that do not have an inland wellfield, have not developed adequate alternative sources of water, and have limited ability to meet user needs through interconnects with other utilities; and "Utilities of Concern", which include utilities having wellfields near the saltwater/freshwater interface, the ability to shift pumpages to an inland wellfield, or an alternative source that is not impacted by the drought (SFWMD, 2007). Miami-Dade WASD wellfields included as "Utility at Risk" are South Miami-Dade Wellfields (Newton, Elevated Tank, Naranja, Leisure City, Roberta Hunter- Caribbean Park). MDWASD Utilities of Concern include the North and Central Miami-Dade Wellfields (Hialeah-Preston and Alexander Orr) (Figure 1).

Figure 6-1. Utilities and Risk and Utilities of Concern, Miami-Dade County (SFWMD, 2007).

6.3.1 Salt Intrusion Monitoring Network

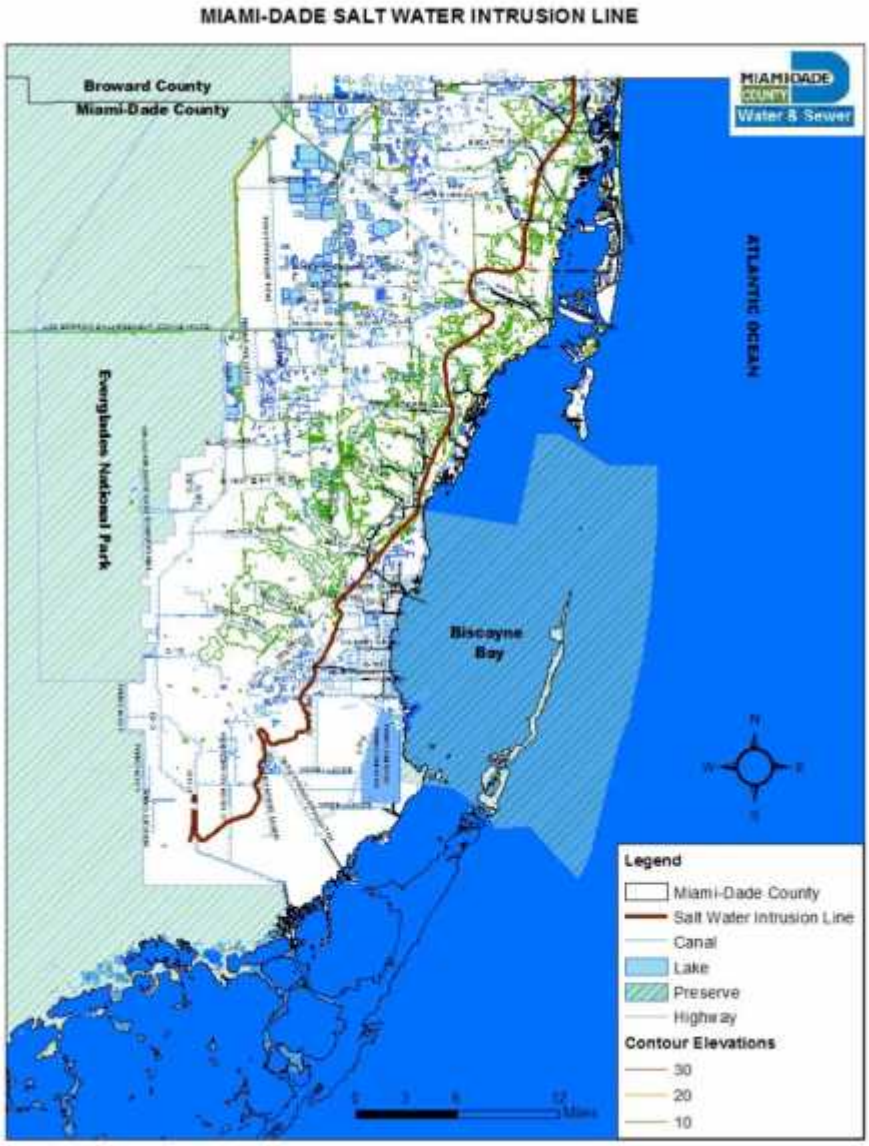
Saltwater intrusion in Miami-Dade County is monitored through a joint effort of the Miami-Dade Water and Sewer Department (MDWASD), Miami-Dade Department of Regulatory and Economic Resources (RER), and the U.S. Geological Survey (USGS). A network of small diameter wells have been drilled to the base of the aquifer to serve as monitor wells to identify the location of the saltwater

intrusion front. The salt front is identified as the location, at the base of the aquifer, of the 1,000 milligrams/per liter (mg/L) isochlor, or line of equal chloride concentration of 1,000 mg/L). Sampling of the monitor wells is done by the USGS, under a co-operative Joint Funding Agreement (JFA) contract with Miami-Dade County for wells currently included in the salt front monitoring program (JFA #14GGESMC0000109). Additional wells are sampled quarterly or yearly basis depending on well location, but every year the sampling schedule includes a county-wide sampling event conducted at the height of the dry season to coincide with the time when inland movement of the saltwater front would be at its peak. The data derived from that sampling is used by the USGS to identify any significant movement of the salt front, and to map the location of the salt front if a significant movement is evident. MDWASD reports the data to the South Florida Water Management District (SFWMD) quarterly, as part of the WUP #13-00017-W requirements, and is required as part of Limiting Condition 37 of the 20-Year WUP (SFWMD, 2007; Appendix H) to submit an annual report summarizing the data collected and recommendations for adjustments to the salt front monitoring network as a result of data analysis.

6.3.2 Salt Intrusion Front Delineation

Miami-Dade WASD entered into a JFA with the USGS in 2007 (JFA #08E0FL208004) to delineate the current extent of saltwater intrusion in the Biscayne aquifer, to characterize how the extent has changed since the last mapping effort, to improve salinity monitoring in the Biscayne aquifer and to identify the sources of the saltwater to better understand the actions required to prevent or mitigate saltwater intrusion. As part of this effort eleven new monitoring wells have been installed in areas where there was insufficient information to identify the location of the front, and data from geophysical tools and techniques were incorporated into the analysis. To improve accessibility of salinity monitoring information to the public, the USGS cooperative water conditions website was improved and a new website created. "Saline Intrusion Monitoring, Miami-Dade County, Florida," serves data collected during this study, as well as data from the active salinity monitoring network, and provides the interpreted maps of the inland extent of saltwater intrusion (*http://www.envirobase.usgs.gov/FLIMS/SaltFront/viewer.htm*, U.S. Geological Survey, 2011g). This website allows the USGS to deliver timely hydrologic data, analyses, and decision-support tools concerning saltwater intrusion. As a result of the JFA, an updated salt front map was published in 2011 (Figure 2) and the final report summarizing the study and recommendations and conclusions published in 2014 (Prinos, et. al. 2014).

Figure 6-2. Salt Water Intrusion extent, Miami-Dade County, FL. (USGS 2011)



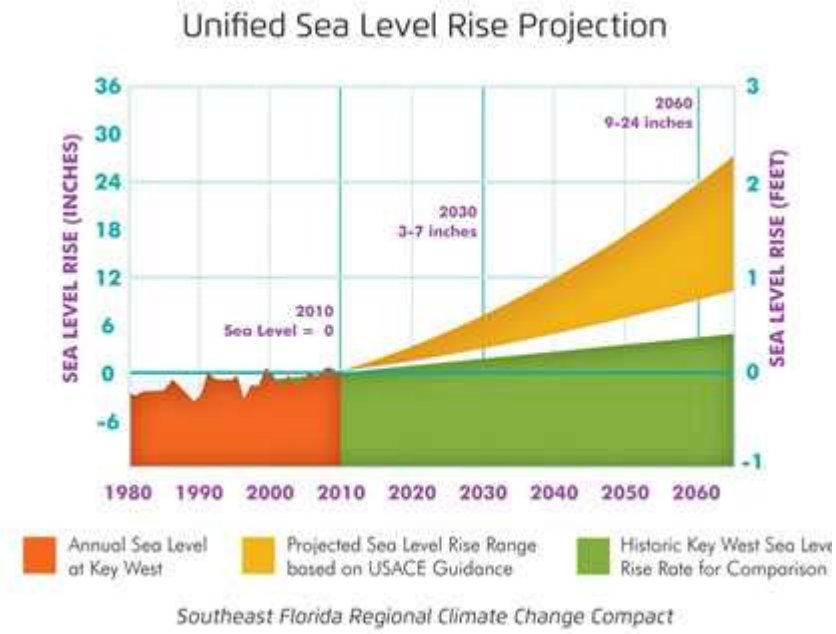
6.4 Urban Miami-Dade County Surface Water/Groundwater Model

Miami-Dade County entered into a Joint Funding Agreement (JFA 08E0FL20817) with the USGS in February 2008 to develop an integrated surface/groundwater numerical flow model, with one of the objectives of the project to evaluate if sea level rise will cause salt water intrusion into coastal wellfields. The numerical model is designed among other uses to evaluate if the current surface-water structure control operational criteria effectively control saltwater intrusion with projected population increase and sea level rise. MDWASD and the USGS use this integrated surface-water/groundwater model to evaluate how the position of the freshwater/saltwater interface will change with increased well field pumpage, increased sea level, and a combination of increased well field pumpage and increase sea level.

The model was developed and calibrated a coupled surface-water/groundwater model of the urban areas of Miami-Dade County, Florida. The model is designed to simulate surface-water stage and discharge in the managed canal system and dynamic canal leakage to the Biscayne aquifer as well as seepage to the canal from the aquifer. The model was developed using USGS MODFLOW-NWT with the SWR1 Process and the SWI2 Package to simulate the surface-water system and seawater intrusion, respectively (Hughes et. al., 2013). Automated parameter estimation software (PEST) and highly-parameterized inversion techniques were used to calibrate the model to observed surface-water stage, surface-water discharge, net surface-water sub-basin canal discharge, and groundwater level data from 1997 through 2004 by modifying hydraulic conductivity, specific storage coefficients, specific yield, evapotranspiration parameters, canal roughness coefficients (Manning's *n* values), and canal leakance coefficients (Walsh and Hughes, 2014).

MDWASD and the USGS used the modified guidance developed by the U.S. Army Corps of Engineers (USACE, 2011) and a planning scenario of 9 to 24 inches additional rise by 2060, consistent with projections presented in the 2014 NCA, and formally adopted by the partner counties in the Southeast Florida Regional Climate Change Compact (Figure 3) for the modeling effort.

Figure 6-3: Unified Southeast Florida Sea Level Rise Projection for Regional Planning Purposes



The USGS has completed the preliminary model and initial scenarios regarding sea level rise, and results are pending publication (USGS, verbal communication). The model simulation period is from 1/1/1996 to 12/31/2010, with daily surface-water and groundwater timesteps. The model was calibrated using highly-parameterized inversion methods, with an 8 year calibration period (1997-2004) and a 6 year verification period (2005-2010). To represent future conditions, 30-year scenario simulation periods representing conditions from 2011 through 2040 were run. The thirty year scenario period was chosen as being scientifically defensible at this point in time with available sea level rise and climate change data available.

Four scenarios have been completed to date, and will be included in the pending publication:

- ***Base scenario***
  - Daily 2010 well field withdraws repeated for 30 year daily
  - meteorological data set (recycled twice)
  - 2008 land use
  - Predicted Virginia Key tidal stage with current linear rate of SEA LEVEL RISE-0.5 ft over 30 years

  - Everglades Depth Estimation Network (EDEN) data set (recycled twice)
  - Historical structure operations - effective gate openings

- ***Scenario 1***
  - Base scenario
  - Increased WASD well field withdrawals - increased rates provided by WASD (WUP 2012 allocations)

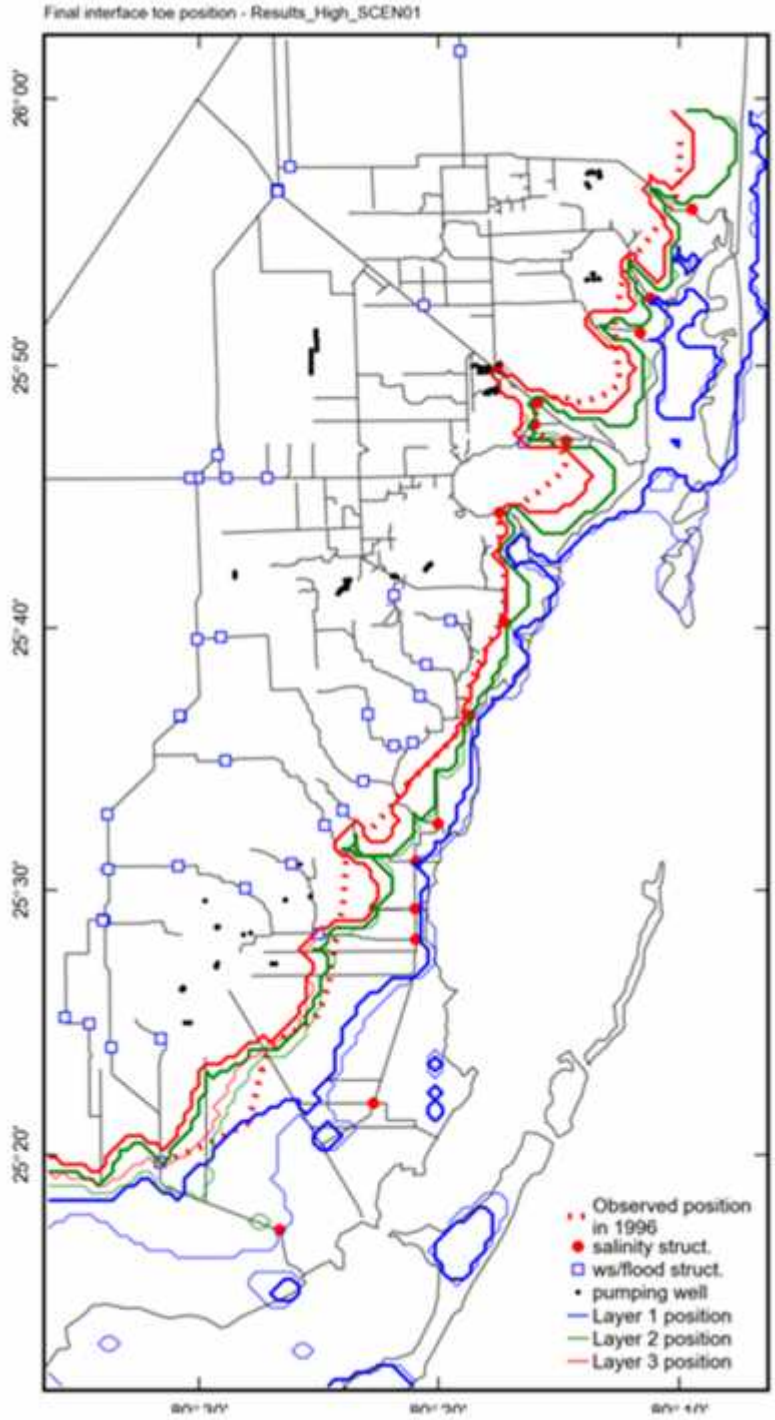
- ***Scenario 2***
  - Base scenario
  - High sea-level rise rate (NRC III rate - 1.23 ft increase over 30 years) added to predicted
  - Virginia Key tidal stage
  - Blend EDEN data and increased sea level where needed

- ***Scenario 3***
  - Scenario 2
  - Increased WASD well field withdrawals at permitted 2025 allocations

Therefore, Scenario 3 represents the high-level rate of sea level rise and the permitted wellfield withdrawals allocated in the SFWMD 20-Year WUP. Results of Scenario 3 indicate minimal change in the salt front (Figure 4).

As a result of the USGS Salt Front JFA, and the on-going salt front monitoring, and the groundwater flow modeling project, Miami-Dade WASD wellfields are not considered at risk for salt water intrusion within the next ten years.

Figure 6-4. Scenario 3 Salt Water Intrusion Results. (Walsh and Hughes, 2014).



6.5 Extreme Weather Events

As extreme events increase in frequency and severity, MDWASD will consider impacts and risks associated with drought, water shortages and reduced groundwater tables, all of which can hasten saltwater intrusion and exacerbate water supply impacts. Conversely, more intense and rapid rainfall will cause flooding, increased runoff, impacts to the natural systems and provide less recharge potential. Integrated water resources management strategies will help to mitigate for these impacts, particularly those projects that can serve to provide additional storage of stormwater runoff, long term storage, and redistribution of excess rainfall during dry periods and drought. Regional surface water reservoirs and belowground aquifer storage and recovery systems are potentially viable alternative water supply projects and climate adaptation strategies. Increases in groundwater elevations, in both direct and indirect response to sea level will challenge the function of drainage systems and is expected contribute to exacerbate flooding, for even mild storm events. Conditions will be more severe with extreme rainfall events can increase damage to lowlying utility infrastructure and contribute to prolonged surface water flooding. Planning for the combined influences of storm events, high tides and sea level rise on drainage system functions and other public infrastructure is a critical need as is the assessment of viable water supplies and impacts to the natural systems from prolonged droughts.

MDWASD has entered into a JFA in 2014 (JFA 14GGESMC0000110) with the USGS to continue the modeling effort, and will develop additional future scenarios with County Departments, local governments, regional agencies for further climate change and sea level rise assessment. These scenarios will include additional years simulation, changes in recharge as a result of climate change, land use changes, and revised sea level rise projections. Future model scenarios to be developed with the USGS include simulating extreme weather events superimposed on future conditions as simulated in model runs.

6.6 Infrastructure Assessment

Effective water treatment plant operations require proper control of flooding from both stormwater (riverine) and tidal sources. Comprehensive engineering analysis considers both short-term and long-term effects of climate change. Short-term effects, such as current increased sea levels and higher estimates of tidal boundary conditions, will be incorporated into the system design and operations as necessary. Potential longer-term climatic changes are typically addressed incrementally as needed through systems master planning, to provide the appropriate level of protection for the given time period, including:

- Greater levels and rates of sea level rise,
- Higher spring tides (exceptionally high astronomical tides that occur around the new and full moon when the planets align to exert maximum effect on the tides),
- Higher tidal boundary effects and backflow,
- Increased levels of tidal surge and wind and wave effects from tropical storms and hurricanes, and
- Potential changes in design rainfall depths and intensities.

MDWASD requires capital improvement projects to include an assessment of climate change and sea level rise. Background information on the site stormwater and tidal conditions is required for site specific projects, and assessment includes projections of potential increases in sea levels, potential ranges of effects on the WTP stormwater management system, and site grading considerations and access for proper operations. The Miami-Dade County hydrologic and hydraulic model XP-SWMM is used to develop peak stage and flood inundation maps. XPSWMM uses a node-link architecture to dynamically route rainfall-runoff through pipe networks and open channels. A variety of data can be analyzed (example FDEP and NOAA tidal data, canal stage data, tidal stillwater data) to adequately assess MDWASD operational sites' vulnerability to continued sea level rise and to provide for potential adaptation options (CDM Smith, 2013).

References

CDM Smith, 2013. Technical Memorandum *Miami-Dade Water and Sewer Department PSA No. 01CDAM003 – Task Authorization No. 12 South Miami Heights (SMH) Water Treatment Plant (WTP) Program Climate Change Adaptation Review*

http://www.envirobase.usgs.gov/FLIMS/SaltFront/viewer.htm

http://www.miamidade.gov/govaction/matter.asp?matter=141211&file=true&yearFolder=Y2014

Hughes, J.D., Langevin, C.D., Chartier, K.L., and White, J.T., 2012, *Documentation of the Surface-Water Routing (SWR1) Process for modeling surface-water flow with the U.S. Geological Survey Modular Ground-Water Model (MODFLOW–2005)*: U.S. Geological Survey Techniques and Methods, book 6, chap. A40 (Version 1.0), 113 p.

Miami-Dade County, July 1, 2014. *Miami-Dade Sea Level Rise Task Force Report and Recommendations (http://www.miamidade.gov/planning/boards-sea-level-rise.asp)*

Prinos, S.T., Wacker, M.A., Cunningham, K.J., and Fitterman, D.V., 2014, *Origins and delineation of saltwater intrusion in the Biscayne aquifer and changes in the distribution of saltwater in Miami-Dade County, Florida*: U.S. Geological Survey Scientific Investigations Report 2014–5025, 101 p., *http://dx.doi.org/10.3133/sir20145025*.

South Florida Water Management District, 2007. *Utilities of Concern in the Lower East Coast Region and Lake Okeechobee Service Area*.

Southeast Florida Regional Climate Change Compact, *http://southeastfloridaclimatecompact.org/*

U.S. Geological Survey, 2007 Joint Funding Agreement 08E0FL208004 *Assessment of seawater encroachment and seawater encroachment monitoring network improvements in Miami-Dade County, Florida.*

U.S. Geological Survey, 2008. Joint Funding Agreement 08E0FL208017 *An integrated model of surface and groundwater flow for evaluating the effects of competing water demands in Miami-Dade County.*

U.S. Geological Survey, 2013. Joint Funding Agreement 14GGESMC0000109 *Investigations of Water Resources.*

U.S. Geological Survey, 2014. Joint Funding Agreement 14GGESMC0000110 *Aquifer hydrogeologic framework, modeling tools and evaluating sea-level rise, Miami-Dade County.*

USACE Engineering Circular 1165-2-212: *Sea-Level Change Consideration for Civil Works Programs* USACE, 2011.

Walsh, V, and J. Hughes. 2014. *Urban Miami-Dade County Surface-Water/Groundwater Model – Application for Sea-Level Rise Evaluation.* 23rd Annual Southwest Florida Water Resources Conference, Fort Myers, FL. January 31, 2014

APPENDIX B

MIAMI DADE WATER AND SEWER DEPARTMENT
WATER USE PERMIT NO. 13-00017W

MDWASD June 2014 Modification Request to the 20-Year Water Use Permit

MIAMI-DADE COUNTY

Carlos A. Gimenez, Mayor

Miami-Dade Water and Sewer Department
P.O. Box 330316 • 3071 SW 38th Avenue
Miami, Florida 33233-0316
T 305-665-7471

miamidade.gov

June 20, 2014

Certified Mail 7001 0360 0001 6783 7652
Electronic Correspondence
CCN: 58468
File Nos. 8DC.19.2

Ms. Maria C. Clemente, P.E.
Bureau Chief, Water Use
South Florida Water Management District
P.O. Box 24680
West Palm Beach, FL 33416-4680
Email: mclement@sfwmd.gov

Subject: Application for Modification and Extension of Water Use Permit No. 13-00017-W

Dear Ms. Clemente:

In accordance with limiting condition 2 and 41 of the subject water use permit, enclosed is a completed application form and check number 00551601 in the amount of $12,500.00 for processing the proposed modifications.

The proposed modifications and extension to the current permit are a result of revised population projections based on the 2010 Census and the continued successful implementation of our County's Water Conservation Plan. The County's projected finished water demands are now markedly lower than anticipated when the first 20-year water use permit application was submitted, and this demand reduction has eliminated the anticipated supply shortages which were the basis for an ambitious schedule of several costly near-term alternative water supply projects that are longer required or needed.

The revised projections for the year 2030 are consistent or slightly lower, than the projections in the District's Lower East Coast Water Supply Update, dated October 2013.

Please contact me at 786-552-8571, or Ms. Bertha Goldenberg, P.E. at 786-552-8120 if there are any questions regarding this application.

Sincerely,

Juan Carlos Arteaga, AIA
Deputy Director

Enclosures: Check Number 00551601 in the Amount of $12,500.00
Completed Water Use Permit Application Form 0645-W01

ec: John A. Lockwood, P.G. jlockwo@sfwmd.gov

MIAMI-DADE COUNTY
Delivering Excellence Every Day

L14063SFWMD-WUP-Mod

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

WATER USE PERMIT APPLICATION FORM (RC-1A, RC-1W, RC-1G)
For all water uses EXCEPT dewatering for mining or construction

General and Specific Authority, Chapter 373, State Statutes, 40E-20 Florida Administrative Code and Basis of Review, Vol III, South Florida Water Management District www.sfwmd.gov/ePermitting.

A. GENERAL INFORMATION

1. *Name of Owner, Responsible Entity, etc.*

Name: Juan Carlos Arteaga, AIA **Project Name:** Modification and Extension of Permit 13-00017-W
Address: P.O. Box 330316
City: Miami **County:** Miami-Dade **State:** FL **ZIP:** 33233-0316
Phone: 786-552-8571 **Cell Phone:** _____ **Fax:** _____ **E-mail:** JCARTEAGA@miamidade.gov

2. *Proof of Ownership is required, in the form of a Deed, tax certificate, lease, or Articles of Incorporation*

ATTACH Proof of Ownership to this Form – Previously Submitted

3. *Name of Engineer, Contractor or Other.*

Name: Bertha M. Goldenberg **Firm:** Miami-Dade Water and Sewer Department
Address: P.O. Box 330316
City: Miami **County:** Miami-Dade **State:** FL **ZIP:** 33233-0316
Phone: 786-552-8120 **Cell Phone:** 305-903-9807 **Fax:** 786-552-8640 **E-mail:** BMG@miamidade.gov

4. *If the above person(s) filling out this form will sign this Application on behalf of the owner, a letter of authorization signed by the owner, stating they are acting on behalf of the owner, must be submitted.*

ATTACH Letter of Authorization to this form – Not Applicable

5. *Is this a* **New Permit** _____ ~~**Renewal**~~/**Modification**/~~**Expired**~~ _____ **Permit No.:** 13-00017-W

6. *Amount of water applied for:* 386.07 million gallons per day (24.63 MGD less than 410.70 MGD in permit)

7. *Has a Surface Water Management Permit or Environmental Resource Permit from the District been issued for this Project?* **SWM / ERP Permit No.:** _____
or has a Surface Water Management Permit or Environmental Resource Permit from the District been applied for? **SWM / ERP Application No.:** _____

8. *A fee of* **$12,500** *is required to process this Application. See Chapter 40E-1.607, F.A.C. for fee schedule.*

ATTACH Application fee to this Form – Check Number 00551601 in the Amount of $12,500.00

9. *Please Identify any District Staff member you have discussed this Application with:*
Mr. John A. Lockwood, P.G. , Lead Hydrogeologist

B. LOCATION OF THE PROPERTY – Previously Submitted

1. *General Location of the Property/Project* – **Previously Submitted**

County: _____ **City:** _____
Sections _____
Township (s) _____ **Range (s)**_____ **(or Land Grant Name)** _____

2. *It will be necessary to submit two drawings to be used as exhibits for this Permit.*
   a. **Location Map,** ($8^1/_2$ x 11), *showing location of the project in relation to major roads.*
   b. **Site Map,** ($8^1/_2$ x 11) *locating project in relation to adjacent streets, canals and water bodies, and showing property boundaries, buildings, on-site lakes/ponds and the location of pumps and wells.*

ATTACH Location Map and Site Map to this Form – Previously Submitted (Exhibits 1, 2, 3, 4)

sfwmd.gov

C. WATER SOURCE and WATER USE TYPE

Please indicate the source of water.

__X__ **Groundwater from an underground aquifer:**

Aquifer Name (if known): Biscayne and Floridan Aquifers

ATTACH Table A for Wells to this form Previously Submitted (Exhibit 5)

_____ **Surface water:**

___ **Onsite Lake/Pond** ___ **Onsite Ditch/Canal**

___ **Adjacent Lake/Open Water, Name:** _____

___ **Adjacent Canal, Name:** _____

ATTACH Table B for Pumps to this Form Not Applicable

Type of water use (Please check at least one)

___ **Agricultural Irrigation** ___ **Landscape Irrigation** ___ **Golf Course Irrigation**

__X__ **Public Water Supply** ___ **Industrial/Commercial** ___ **Aquaculture**

__X__ **Aquifer Storage/Recovery (ASR)** ___ **Other (Please describe):** _____

D. IRRIGATION WATER USE - **Not Applicable**

1. *Is this permit for irrigation?* **Landscape:** _____ **Golf:** _____ **Agriculture:** _____ **Crop type:** _____
   What is the **Total Project Acreage:** _____ **Irrigated Acreage:** _____

ATTACH Table D for Crop Information to this Form - Not Applicable

2. *Applications for golf or landscape irrigation in excess of 500,000 gallons per day require a water conservation plan as explained in Section 2.3.1 of the Basis of Review.*

ATTACH, if needed, a water conservation plan for golf or landscape irrigation - Not Applicable

E. PUBLIC WATER SUPPLY WATER USE

1. *Is this permit for Public Water Supply?* **Yes**

   Maximum gallons per month needed: 13,117 MG **Average gallons per day:** 386.07MGD (End of 2033)

   Permit Duration requested: 19 **Years** - Requested 386.07MGD (2033) is less than 410.7 MGD (2030)

2. *A map of the service area for the utility, (8 1/2 x 11) showing boundaries of service, water treatment plants, storage facilities, the location of all production and monitor wells is required.*

ATTACH Location Map and Service Area Map to this Form - Previously Submitted

3. *For public water supplies using more than 100,000 gallons per day, applicants must meet criteria and identify the demand for each use/component including number, type and size of service connections; past pumpage, projected population data, future expected pumpage, water treatment method and losses and other specific data as identified in Section 2.1 and 2.6 of the Basis of Review. Tables F (past water use), Table G (projected water use) and Table I (treatment method and losses) must be submitted.*

ATTACH water supply demand computations and Tables F, G and I to this Form - Attached are updated forms Tables F (Exhibit 7) and G (Exhibit 8a and 8b)

4. *For public water supplies using more than 100,000 gallons per day, other necessary information requirements may include if applicable: explanations of per-capita greater than 200 GPD, water supply system interconnections, water received from or distributed to other entities, and aquifer storage and recovery. Please submit Tables H (for per capita use greater than 200 GPD), Table J (ASR), Table K (interconnections), and Table E (water received from or distributed to other entities) if necessary.*

ATTACH, if needed, Tables H, J, K and E to this Form – Updated Table E (Exhibit 11) attached, Table H (Not Applicable), Table J (Not Applicable, pending ASR cycling testing), Table K (Exhibits 12A-C Previously Submitted)

5. *Applications for public water supply in excess of 500,000 gallons per day require a water conservation plan as explained in Section 2.6.1 of the Basis of Review.*

ATTACH, if needed, a water conservation plan for public water supply to this Form - Previously Submitted

F. INDUSTRIAL, COMMERCIAL AND OTHER WATER USES - **Not Applicable**

1. *Is this permit for Industrial/Commercial?* **Nature of the Business:** _____

   _____

   Maximum gallons per month needed: _____

   Average gallons per day needed: _____

2. *Industrial/commercial applicants using more than 100,000 gallons per day must provide information on the water balance for the operation, including all sources of water and losses of water for processes, personal/sanitary needs, treatment losses and unaccounted uses. A flow chart for the water balance should be submitted.*

ATTACH water balance and flow chart to this Form - Not Applicable

3. *For uses other than Irrigation, Public Water Supply, Industrial or Commercial, but excluding mining/dewatering (Air conditioning, pool heating, mitigation, etc.):*

   Describe Water Needs: _____

   Maximum gallons per month needed: _____

   Average gallons per day needed: _____

ATTACH a written explanation and calculations used to determine the amount of water you need - Not Applicable

4. *Applications for industrial, commercial and other water uses in excess of 500,000 gallons per day require a water conservation plan as explained in Section 2.4.1 of the Basis of Review.*

ATTACH, if needed, a water conservation plan for industrial, commercial or other water supply - Not Applicable

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G. ADDITIONAL REQUIREMENTS IF YOU ARE USING MORE THAN 100,000 GALLONS PER DAY

1. *The withdrawal of water must not cause harm to sensitive areas, wetlands or saline water intrusion. It may be necessary to supply modeling to address impacts of the water use.*

ATTACH, if needed, modeling or documentation on environmental impacts to this Form – Previously Submitted

2. *All applicants withdrawing water in proximity to saline surface or ground water, or withdrawing saline water that may come in contact with fresh surface or ground water, are required to develop a saline water monitoring program as described in Section 4.2 of the Basis of Review.*

ATTACH, if needed, a saline water monitoring program – Previously Submitted (Exhibits 27 through 28)

3. *Except for Public Water Supply, reclaimed water must be used when readily available, unless it is not environmentally, technically or economically feasible to do so, as explained in Section 3.2.3 of the Basis of Review.*

ATTACH, if needed, an evaluation of the feasibility of using reclaimed water and a letter from your local utility regarding their availability of reclaimed water to this Form - Not Applicable, Public Water Supply

4. *An aerial photograph of the entire project site is required.*

ATTACH an aerial photograph – Previously Submitted

5. *Section 4.1 of the Basis of Review requires all wells and pumps be equipped with a calibrated meter or other acceptable water use accounting method.*

ATTACH calibration reports of the water use accounting method for each well and pump – Previously Submitted

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H. ATTACHMENTS

Please make sure you have included the following attachments with your Application: – **Previously Submitted**

___**Proof of Ownership**
___**Letter of Authorization (where required)**
___**Location Map**
___**Site Map**
___ **Table A for Wells – Previously Submitted**
___ **Table B for pumps – Not Applicable**
_X_ **Application Fee – Attached**

*For **Irrigation water use**, also make sure you have included the following attachments:*

___ **Table D for crop information**
___ **Water conservation plan (if needed)**

*For **Public Water Supply water use of more than 100,000 gallons per day**, also make sure you have included the following attachments:*

_X_ **Table F for past water use**
_X_ **Table G for projected water use**
___ **Table H for projected water use greater than 200 gpcd (if needed)**
___ **Water conservation plan (if needed)**
___ **Service Area Map – Previously Submitted**
___ **Table I for treatment method and losses**
___ **Table J for ASR well operations (if needed)**
___ **Table K for interconnections (if needed)**
___ **Table E for water received from or delivered to other entities (if needed)**

*For **Industrial water use of more than 100,000 gallons per day**, also make sure you have included the following attachments:*

____**Water balance and flow chart**
___ **Water conservation plan (if needed)**

*For **Commercial or other water use** that is not irrigation, public water supply, or industrial, also make sure you have included the following attachments:*

____ **Explanation of how you determined the amount of water you need**
____ **Water conservation plan (if needed)**

Attachments for additional special requirements – **Previously Submitted**

___ **Saline Water Monitoring Plan – Previously Submitted**
___ **Feasibility evaluation or reclaimed water use**
___ **Aerial Photograph**
___ **Letter from reclaimed water utility**
___ **Modeling or documentation of impacts of water use – Previously Submitted**
___ **Reports of calibration of water use accounting method for wells and pumps – Previously Submitted**

I. CERTIFICATION

I hereby certify that, to the best of my knowledge, the total project acreage listed above is owned or controlled by me and encompasses the project referenced in this permit application. In addition, I agree to provide entry to the project site for South Florida Water Management inspectors with proper identification or documents as required by law for the purpose of making analyses of the site. Further, I agree to provide entry to the project site for such inspectors to monitor permitted work if a permit is granted. If I do not use the water for which this permit is issued within two years the permit may be revoked. If this application is not complete within 240 days, it may be denied pursuant to Rule 40E-1.603, Florida Administrative Code.

Juan Carlos Arteaga, AIA
Print: **Name of Owner or Authorized Agent**

Deputy Director
Title

Juan C Arteaga
Signature:

Attachment to Application for Modification and Extension of
Water Use Permit Number 13-00017-W
Miami-Dade County
June 2014

This application is to extend and to make modifications to the water use permit 13-00017-W consistent with the County's most recent projected finished water demands to 2035 as determined with latest lower population projections based on 2010 Census results and historically lower per capita daily finish water use. These reduced projected finish water demands has eliminated the need for several costly alternative water supply projects in their entirety and postponed the need for other alternative water supply projects by several years. The revised projections for the year 2030 are consistent or slightly lower, than the projections in the District's Lower East Coast Water Supply Update, dated October 2013. This application seeks to remove the requirements to complete any costly unnecessary alternative water supply projects from the existing permit and to reschedule the timing and completion of the alternative water supply projected that are needed. Additional revisions to the permit conditions are also sought to reflect annual reporting submittal dates, to allow District staff additional authority in the promotion of alternative water supply use and providing additional water for aquifer recharge and subsequent recovery, and provide clarification. The following revisions to the water use permit 13-00017-W:

LIMITING CONDITION 1
Revise Limiting Condition 1 to read:
This permit shall expire on December 31, 2033.

LIMITING CONDITION 5
Revise Limiting Condition 5 to reflect reduction in annual allocation from 149906 MG (previously projected 2030 demand) to 140916 MG (the currently projected 2033 demand). Other revisions as needed.

LIMITING CONDITION 19
Revise Limiting Condition 19 to read:
The Permittee shall provide annual status reports to the District that summarizes the ASR well cycle testing activities by April 15th each year until the conclusion of ASR well cycle testing.

LIMITING CONDITION 24
MDWASD is requesting that Limiting Condition 24 be deleted. In accordance with the permit, MDWASD is including the use of the Floridan aquifer as an alternative water supply source in the following two locations:

1. The Hialeah Reverse Osmosis Water Treatment Plant (WTP). At this WTP, the construction of the treatment process has been completed, but there are wells pending to be constructed, by April 2015. When all the wells are completed, the plant will be operated at the maximum flow of 10 MGD, in accordance with the operating contract. Therefore, condition 24 is not applicable.
2. The proposed South Miami Heights (SMH) WTP. This SMH program is being developed at this time. At an ultimate 20 mgd plant operating capacity, the raw water withdrawal would be 3.00 MGD from the Biscayne and 23.27 MGD from the Floridan in accordance with our Wellfield Operation Plan. In order to maintain operational flexibility and protect the nanofiltration membranes (Biscayne supply), MDWASD is requesting that the WTP be allowed to operate

with up to a constant supply of 3.0 MGD from the Biscayne aquifer and the rest, to meet demand, be provided from the Floridan aquifer. The full use of the small Biscayne aquifer allocation at SMH supplemented by Floridan aquifer water will allow a blended finished water product that is expected to be lower in sodium and chloride, which will be beneficial to customers on low sodium diets, and more will require less chemical addition for product water stabilization. The Biscayne allocation is only 11% of the total supply and it is less than the current allocation of 9.1 MGD for the South Dade Water System, which is a 67% reduction in pumpage from the Biscayne.

LIMITING CONDITION 28
Revise Limiting Condition 28 to read:
No more than 15 MGD shall be withdrawn from the West Biscayne aquifer Wellfield on any given day; except when additional withdrawals, consistent with Exhibit 35, are authorized by District staff for West Floridan aquifer recharge.

LIMITING CONDITION 39
Revise Limiting Condition 39 to read:
The permittee shall update the District on the status of reuse projects included in Exhibit 14 on an annual basis in accordance with Limiting Condition 42.

LIMITING CONDITION 40
No revisions to limiting condition 40 required, however a revised Exhibit 13 is being submitted with changes to the alternative water supply projects and development deadlines.

LIMITING CONDITION 41
No revisions to limiting condition 41 required, however a revised Exhibit 13 is being submitted with changes to the alternative water supply projects and development deadlines.

LIMITING CONDITION 42
Delete the last sentence in Limiting Condition 42 and revise the first portion of Limiting Condition 42 to read:
The Permittee shall provide the District with annual updates by April 15th each year...

LIMITING CONDITION 43
Revise Limiting Condition 43 to read:
The permittee shall update the District on the status of reuse projects included in Exhibit 14 on an annual basis in accordance with Limiting Condition 42.

LIMITING CONDITION 44
Revise first sentence in Limiting Condition 44 to read:
The permittee shall update the District on the status of reuse projects included in Exhibit 14 on an annual basis in accordance with Limiting Condition 42.

LIMITING CONDITION 45
Revise Limiting Condition 45 to read:
For rehydration of Biscayne Coastal Wetlands, in consultation with the District, the FDEP and Biscayne Bay National Park, upon completion of the pilot testing program, the parties shall agree on the water quality treatment required and the feasibility, as defined in Section 3.2.3.2 of the Basis of Review for Water Use, of this project on or before August 15, 2014. Extension of this deadline may be issued in writing by the District upon demonstration of good cause such as

events beyond the control of the permittee or after consideration of the results/data collected, the District determines that additional testing is necessary. In determining the water quality needed, the parties will consider State and Federal water quality discharge standards, the volume and timing of water to be delivered to Biscayne Bay and the location of delivery. In the event the parties do not reach agreement on the feasibility by August 15, 2014, the Permittee shall begin development of an alternate reuse project from the South District wastewater facility and shall provide the District with a proposal for an alternate project including a conceptual design and schedule for implementation on or before July 15, 2015.

LIMITING CONDITION 48
Revise the last sentence of Limiting Condition 48 to read:
The permittee shall submit an annual report covering water conservation activities during the prior calendar year by April 15 of each year describing water conservation activities for the year including expenditures, projects undertaken and estimated water savings.

LIMITING CONDITION 49
Revise first sentence in Limiting Condition 49 to read:
Permittee shall determine unaccounted-for distribution system losses on a quarterly basis and report the findings on an annual basis (Exhibit 16A). The losses shall be determined for the entire system and for each of the water treatment plants (comparing water pumped from the wells compared to the volume into and out of the treatment plant), utilizing the most recent, approved water accounting and International Water Association / American Water Works Association (IWA / AWWA) water audit methodologies (Exhibit 16B). The permittee shall verify the most recent IWA / AWWA water audit methodologies to be used in each annual report. The annual report shall cover activities during the prior calendar year and be submitted on April 15 of each year. In addition to the unaccounted-for loss data, the report shall include the status of the activities (actions and expenditures along with the associated water savings) completed during the year to implement the approved water loss reduction plan (Exhibit 17).

In the event that the annual unaccounted-for distribution system losses, as defined by Section 5.2.1.E of the Basis of Review for Water Use Permit Applications within the South Florida Water Management District, exceeds 10 percent, the permittee shall include in the annual report a description of additional actions which will be implemented the following year(s) to reduce the losses to less than ten percent. If the District concludes that the progress towards achieving losses of less than 10 percent as identified in the unaccounted for losses plan is inconsistent with the plan schedule, the Permittee shall be required to revise the plan, to be approved by the District.

EXHIBITS 1 through 6
No revisions are proposed.

EXHIBIT 7
Remove or replace original Exhibit 7 (Table F) with the revised Exhibit 7 (Table F) to reflect past water usage from 2004 to 2013 and update historical population served based on 2010 census.

EXHIBIT 8
Replace the original Exhibits 8A and 8B (Table G) with updated Exhibits 8A and 8B (Table G) reflecting decreased per capita finished water usage, projected population served, decreased finished water demands, and raw water demands to 2033.

EXHIBIT 9
Replace the original Exhibit 9 with the new Exhibit 9 depicting the historical and projected finish water demands, available supply with proposed alternative water supply ground water facilities to 2035.

EXHIBIT 10
Replace the original Exhibits 10A and 10B with the attached revised Exhibits 10A and 10B to reflect the extension to 2035 and changes in the proposed the Biscayne and Floridan aquifer water supply wells.

EXHIBIT 11
Replace the original Exhibit 11 with updated Exhibit 11.

EXHIBIT 12
No revision is proposed.

EXHIBIT 13
Replace the original Exhibit 13 with the attached revised Exhibit 13 reflecting the proposed changes to the alternative water supply projects and development deadlines.

EXHIBIT 14
Replace the original Exhibit 14 with the attached revised Exhibit 14 reflecting the proposed changes to the reuse projects and deadlines.

EXHIBITS 15 through 37
No revisions are proposed.

Table F (June 2014)
Miami-Dade Water and Sewer Department (MDWASD)
Past Water Use (2004-2013)

1	2	3	4	5	6	7	8	9	10	11	12	13
FINISHED WATER HISTORICAL USE							RAW WATER HISTORICAL USE [a]					Ratio Finished:Raw (Total Annual Use)
Year	Population Served *	Per Capita Usage (gpcd)	Total Annual Use (MG)	Average Month Use (MG)	Max Month Use (MG)	Ratio Max : Aver. Month	Per Capita Usage (gpcd)	Total Annual Use (MG)	Average Month Use (MG)	Max Month Use (MG)	Ratio Max : Aver. Month	
TOTAL MDWASD WATER SYSTEM SERVICE AREA **												
2004	2,090,099	162.5	124,301	10,358	10,861.1	1.05	165.6	126,685	10,557	11,063	1.05	1.019
2005	2,101,772	161.8	124,098	10,342	10,734.8	1.04	165.1	126,670	10,556	11,031	1.04	1.021
2006	2,113,445	161.6	124,677	10,390	10,988.6	1.06	164.7	127,019	10,585	11,170	1.06	1.019
2007	2,125,118	150.3	116,602	9,717	10,485.4	1.08	151.6	117,585	9,799	10,648	1.09	1.008
2008	2,136,791	138.1	108,029	9,002	9,583.0	1.06	149.4	116,820	9,735	10,508	1.08	1.081
2009	2,148,464	142.3	111,627	9,302	9,662.7	1.04	151.2	118,575	9,881	10,550	1.07	1.062
2010	2,160,138	141.4	111,453	9,288	9,700.0	1.04	151.0	119,056	9,921	10,346	1.04	1.068
2011	2,181,073	140.2	111,585	9,299	9,597.6	1.03	149.2	118,768	9,897	10,273	1.04	1.064
2012	2,202,008	134.8	108,626	9,052	9,693.9	1.07	142.5	114,807	9,567	10,223	1.07	1.057
2013	2,222,944	135.7	110,388	9,199	9,483.7	1.03	144.6	117,623	9,802	10,252	1.05	1.066
3-year Average (2011-2013)	-	136.9	-	-	-	1.04	145.4	-	-	-	1.05	1.062

EXHIBIT 7

* Source of Population Information: Miami-Dade County (MDC) Planning Department. Historic Population 2001 to 2009 adjusted (downward) based on, and 2010 to 2013 represents the 2010TAZ population projections by the MDC Planning Department, based on 2010 Census.

** For 2004 - 2007 from MDWASD Raw & Finished Water Historical Data. For 2008 - 2013 from MDWASD reports to SFWMD of Water Treatment Plant Influent & Effluent Flow Meter Flows

(a) Raw-to-finished water ratio is 1.06. MDWASD is improving its raw water metering/accounting system.

TABLE G (June 2014)
MDWASD PROJECTED RAW WATER DEMAND BY SOURCE

1	2	3	4	5	6	7	8	9	10	20	21	22	23	24	25	26	27	28	29
	PROJECTIONS (2013) FOR MDWASD SERVICE AREA									RAW WATER AADD (MGD)									
										Biscayne Aquifer[f]						Floridan Aquifer			
										South Dade[g]									
Year	Population[a]	Finished Water Use (gpcd)	AADD Finished Water Use[b] (MGD)	Water Conservation[c] (MGD) Credit	Reuse/ Reclaimed Water[d] (MGD) Credit	Adjusted Finished Water Demand[e] (MGD)	Adjusted Finished Water Use (gpcd)	CITY OF HOMESTEAD Finished Water Demand (MGD)	AADD Finished Water "SURPLUS" (Col. 10 - Col. 9 - Col. 7)	Elevated Tank/ Leisure City/ Naranja	Everglades Labor Camp/ Newton[h]	South Miami Heights (SMH) Membrane Softening WTP[i,m]	Hialeah-Preston/ Alexander-Orr Lime Softening (Lm)	ASR Losses[k]	Total Biscayne Aquifer (f,n)	Hialeah RO WTP[l]	South Miami Heights (SMH) RO WTP[m]	Total Floridan Aquifer	Total All Sources
System-Wide																			
2014	2,243,879	136.9	307.19	1.36	0.00	305.83	136.30	2.50	0.00	4.30	4.08	0.00	310.58	0.14	319.10	10.00	0.00	10.00	329.10
2015	2,266,092	136.9	310.23	2.04	0.00	308.19	136.00	3.00	0.00	4.30	4.10	0.00	310.94	0.14	319.48	13.30	0.00	13.30	332.78
2020	2,370,769	136.9	324.56	5.44	0.00	319.12	134.61	3.00	0.00	0.00	*4.10*	3.00	310.23	0.14	313.37	13.30	23.27	36.57	349.94
2025	2,475,446	136.9	338.89	8.84	0.00	330.05	133.33	3.00	0.00	0.00	*4.10*	3.00	321.84	0.14	324.98	13.30	23.27	36.57	361.55
2030	2,580,123	136.9	353.22	9.55	0.00	343.67	133.20	3.00	0.00	0.00	*4.10*	3.00	336.30	0.14	339.44	13.30	23.27	36.57	376.01
2031	2,601,058	136.9	356.08	9.55	0.00	346.53	133.23	3.00	0.00	0.00	*4.10*	3.00	339.34	0.14	342.48	13.30	23.27	36.57	379.05
2032	2,621,994	136.9	358.95	9.55	0.00	349.40	133.26	3.00	0.00	0.00	*4.10*	3.00	342.39	0.14	345.53	13.30	23.27	36.57	382.10
2033	2,642,929	136.9	361.82	9.55	0.00	352.27	133.29	3.00	0.00	0.00	*4.10*	3.00	346.36	0.14	349.50	13.30	23.27	36.57	386.07

MDWASD PROJECTED FINISHED WATER DEMAND BY SOURCE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	PROJECTIONS (2013) FOR MDWASD SERVICE AREA								ADJUSTED FINISHED WATER AADD (MGD)								
									Biscayne Aquifer					Floridan Aquifer			
									South Dade[g]								
Year	Population[a]	Finished Water Use (gpcd)	AADD Finished Water Use[b] (MGD)	Water Conservation[c] (MGD) Credit	Reuse/ Reclaimed Water[d] (MGD) Credit	Adjusted Finished Water Demand[e] (MGD)	Adjusted Finished Water Use (gpcd)	CITY OF HOMESTEAD Finished Water Demand (MGD)	Elevated Tank/ Leisure City/ Naranja	Everglades Labor Camp/ Newton[h]	South Miami Heights (SMH) Membrane Softening WTP[i,m]	Hialeah-Preston/ Alexander-Orr Lime Softening (i)	Total Biscayne Aquifer (f)	Hialeah RO WTP[l]	South Miami Heights (SMH) RO WTP[m]	Total Floridan Aquifer	Total All Sources
System-Wide																	
2014	2,243,879	136.9	307.19	1.36	0.00	305.83	136.30	2.50	4.30	4.08	0.00	292.45	300.83	7.50	0.00	7.50	308.33
2015	2,266,092	136.9	310.23	2.04	0.00	308.19	136.00	3.00	4.30	4.10	0.00	292.79	301.19	10.00	0.00	10.00	311.19
2020	2,370,769	136.9	324.56	5.44	0.00	319.12	134.61	3.00	0.00	*4.10*	2.55	292.12	294.67	10.00	17.45	27.45	322.12
2025	2,475,446	136.9	338.89	8.84	0.00	330.05	133.33	3.00	0.00	*4.10*	2.55	303.05	305.60	10.00	17.45	27.45	333.05
2030	2,580,123	136.9	353.22	9.55	0.00	343.67	133.20	3.00	0.00	*4.10*	2.55	316.67	319.22	10.00	17.45	27.45	346.67
2031	2,601,058	136.9	356.08	9.55	0.00	346.53	133.23	3.00	0.00	*4.10*	2.55	319.53	322.08	10.00	17.45	27.45	349.53
2032	2,621,994	136.9	358.95	9.55	0.00	349.40	133.26	3.00	0.00	*4.10*	2.55	322.40	324.95	10.00	17.45	27.45	352.40
2033	2,642,929	136.9	361.82	9.55	0.00	352.27	133.29	3.00	0.00	*4.10*	2.55	325.27	327.82	10.00	17.45	27.45	355.27

EXHIBIT 8A

TABLE G (June 2014)
MDWASD PROJECTED RAW AND FINISH WATER DEMAND BY SOURCE

Footnotes

(a) Population Served represents most recent represents the 2010TAZ population projections by the MDC Planning Department.

(b) Annual Average Daily Demand (AADD) Finished Water Projections between 2014 and 2035 assume 136.9 gpcd (a decrease from 145.4 gpcd) total water system demand prior to application of credits (e.g. conservation).

(c) WASD has implemented a 20-year water use efficiency plan and is experiencing reductions in per capita water consumption. Water Conservation projections were revised based on the 2010 Annual Water Conservation Plan Conserve Florida Report (March 2011). Real losses in non-revenue water (e.g. unaccounted-for-water) are assumed to remain at less than 10%. The conservation amounts experienced through 2010 (6.54 MGD) were deducted from the 20-year conservation amount in the Conserve Florida Report and the remaining conservation amounts were distributed for the balance of the 20-year period (2011-2027).

(d) Not Used (TBD).

(e) Adjusted after taking credit in finished water demand projections for reductions in finished water use associated with water conservation.

(f) The Modified Base condition raw water use (349.5 mgd) represents values agreed to by SFWMD and MDWASD and demonstrated by modeling to not cause a net increase in water from the regional canal system. Biscayne Aquifer base condition raw water use allocation of 349.5 mgd (South Dade at 7.1 mgd, North and South at 342.4 mgd) equates to 342.8 mgd of finished water annual average daily demand (AADD).

(g) South Dade (Raw : Finished) Ratio = 1.0 : 1.0

(h) Becomes *stand-by* once SMH WTP starts up. This *stand-by* capacity is not used in the total raw and finished water amounts.

(i) Assumes withdrawals from Elevated Tank, Leisure City, Naranja, Caribbean Park, Former Plant, and Roberta Hunter Park are consolidated. Biscayne Aquifer supplied Membrane Softening (Raw : Finished) Ratio = 1.17 : 1.00 (85% Recovery).

(j) Hialeah-Preston / Alexander-Orr (Raw : Finished) Ratio = 1.082 : 1.00 (Lime Softening)

(k) The values are based on initial cycle testing of the ASR well facilities and the projected seasonal operations of the ASR well facilities at full design capacities with the storing of Biscayne aquifer water during the wet weather months of June through October and the recovery of the stored Biscayne aquifer water during the dry weather months of December through April, assuming an ultimate storage loss of 1.31%.

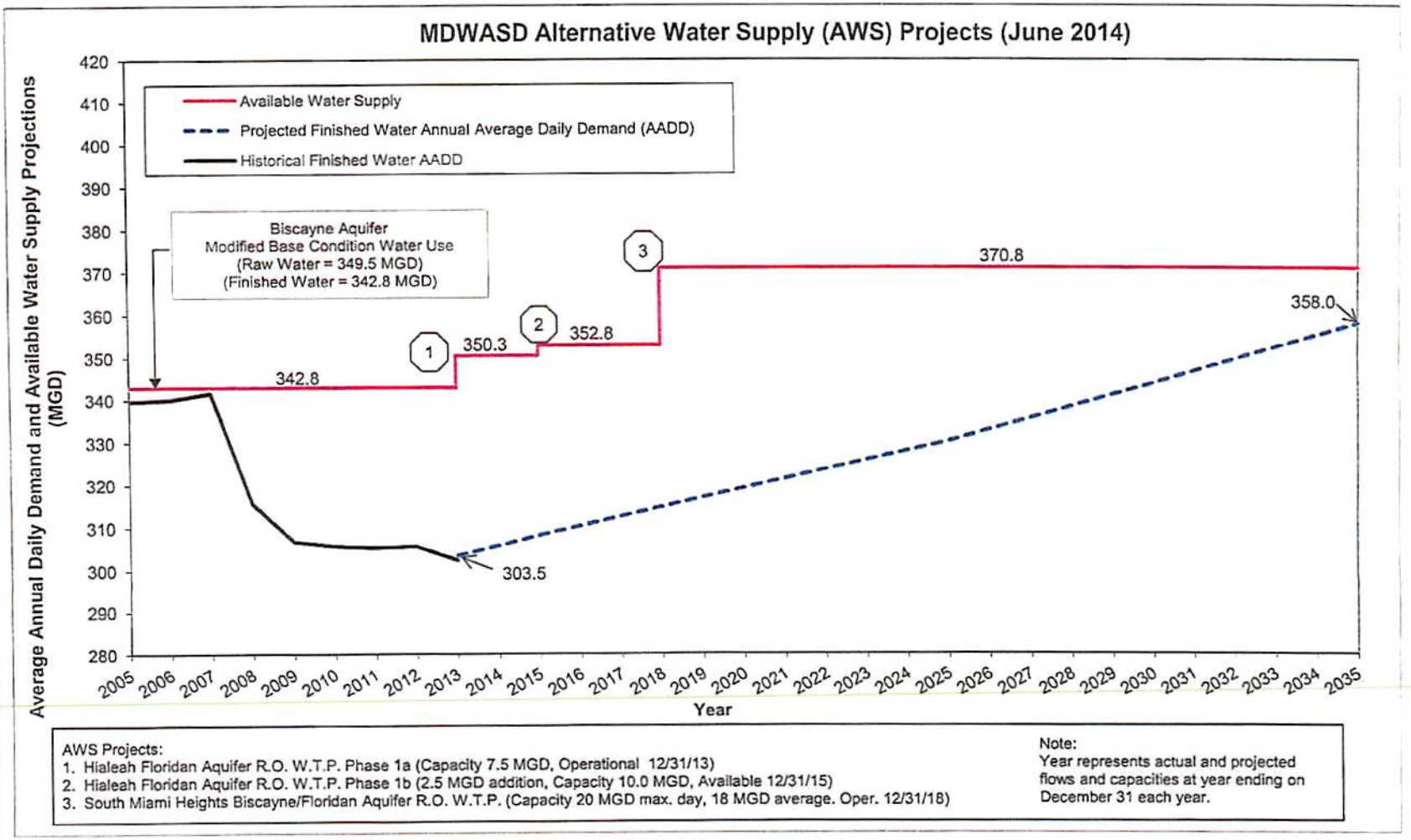
(l) Floridan Aquifer supplied RO WTP (Raw : Finished) Ratio = 1.333 : 1.00 (75% recovery)

(m) At an ultimate 20 mgd plant operating capacity, the raw water withdrawal would be 3.00 MGD from the Biscayne and 23.27 MGD from the Floridan in accordance with the Wellfield Operation Plan. In order to maintain operational flexibility and protect the nanofiltration membranes (Biscayne supply), MDWASD is requesting that the WTP be allowed to operate with up to a constant supply of 3.0 MGD from the Biscayne aquifer and the rest, to meet demand, be provided from the Floridan aquifer. The full use of the small Biscayne aquifer allocation at SMH supplemented by Floridan aquifer water will allow a blended finished water product that is expected to be lower in sodium and chloride, which will be beneficial to customers on low sodium diets, and more will require less chemical addition for product water stabilization.

(n) An additional 0.92 MGD of Raw Water AADD has been included in year 2033 for Hialeah-Preston / Alexander Orr Lime Softening to maintain the total Biscayne aquifer Modified Base condition raw water use at 349.5 mgd and to provide needed operational flexibility in withdrawals of Floridan aquifer water.

EXHIBIT 8B

EXHIBIT 9



Alternative Water Supply Projects Step Chart June 2014

MDWASD Biscayne Aquifer Wellfields Operation Plan Summary (June 2014)

1	2	3	4		5	6	7	8	9	10	11	12	13
WTP Subarea and Wellfield	Existing Wellfield Data (2014		Historic [b] (Pre 4/1/2006) Base Condition Annual Average Pumpage (MGD)	Revised Base Condition Annual Average Pumpage (MGD)	Individual Wellfield ANNUAL AVERAGE Pumpage Allocation								Remarks
	Design Capacity (mgd)	Number of Wells			2014-2017		2018 - 2025		2026 - 2030		2031 - 2033		
					BG	(mgd)	BG	(mgd)	BG	(mgd)	BG	(mgd)	
Hialeah-Preston [c]													
Hialeah	12.54	3	3.1										
John E. Preston	53.28	7	37.2	70.0	25.550	70.00	25.550	70.00	25.550	70.00	25.550	70.00	Total not to exceed 25.500 BGY
Miami Springs	79.3	20	29.7										
Medley	48.96	4	0										
Northwest [a]	149.35	15	88.7	96.8	35.332	96.80	35.332	96.80	35.332	96.80	35.332	96.80	
Subtotal	343.43	49	164.5	155.4	56.721	155.40	56.721	155.40	56.721	155.40	56.721	155.40	
Alexander Orr [d]													
Alexander Orr	74.40	10	82.0	40.0									
Snapper Creek	40.00	4	20.4	21.9	62.524	171.30	62.524	171.30	62.524	171.30	62.524	171.30	
Southwest	181.20	17	83.8	109.4									
West	32.40	3	15.0	15.0	5.475	15.00	5.475	15.00	5.475	15.00	5.475	15.00	
Subtotal	308.00	34	181.2	186.3	67.999	186.30	67.999	186.30	67.999	186.30	67.999	186.30	
South Dade [e]													
Elevated Tank	4.32	2	1.3	1.3									Drops out when SMH comes on line.
Leisure City	4.18	4	2.9	2.9	1.570	4.30	-	-	-	-	-	-	Turning off at 4.3 mgd resulted in a 2.5 mgd reduction in impact to regional canals, making 2.5 mgd available to SMH wellfield.
Naranja	1.15	1	0.1	0.1									
Everglades Labor Camp [e]	5.04	3	0.7	2.2	1.752	4.80	*1.752*	*4.80*	*1.752*	*4.80*	*1.752*	*4.80*	Goes to standby after SMH comes online in 2018. Subject to limitation of 4.8 mgd (1.752 BGY) and system wide total not-to-exceed allocation.
Newton [e]	4.32	2	2.1	2.6									
Subtotal	19.01	12	7.1	7.8	2.847	7.80	*1.752*	*4.80*	1.752	*4.80*	*1.752*	*4.80*	
South Miami Heights [f]													
Former Plant	*4*	*1*	*NA*	*NA*	-	-	1.095	3.00	1.095	3.00	1.095	3.00	Initial 2.5 mgd transfer from shut down of 4.3 mgd at South Dade plus 0.5 mgd additional
Roberta Hunter Park	*6*	*4*	*NA*	*NA*									
Subtotal	*10.00*	*5*			0.000	0.00	1.095	3.00	1.095	3.00	1.095	3.00	
MDWASD System Total	680.44	100	347.0	349.5									
Total Not-To-Exceed System Wide Pumpage			Annual in BGY (mgd)		127.567	349.50	127.567	349.50	127.567	349.50	127.567	349.50	System wide allocation, not less than revised baseline allocation, not the sum of individual wellfield pumpage allocations, and may be more restrictive.

Notes: BG = Billion Gallons; MGD = Million Gallons per Day

(a) Northwest wellfield design capacity at 110 mgd when pumps operate at low speed.

(b) These numbers are based on historical raw water values at the treatment plants for a 12-month running average during the five-year period preceding 4/1/2006 in accordance with SFWMD Water Availability Rule (April 28, 2007). Values for the individual wellfields are approximations.

(c) Base Condition Water Use of the North System, Hialeah-Preston is 164.5 mgd. The base condition impacts of 9.1 mgd for historical water deliveries by MDWASD to City of North Miami Beach were transferred to the City with re-issuance of their permit in July 2007; revising the base condition to 155.4 mgd.

(d) Base Condition Water Use of the Central System, Alexander Orr is 181.2 mgd. It was demonstrated through modeling that transferring 22.0 MGD from Alexander Orr WTP well field to the Southwest and an additional withdrawal of 1.5 MGD at Snapper Creek and 3.6 MGD at Southwest would not cause a net increase in volume or cause a change in timing of surface and groundwater from Everglades water bodies, consistent with Section 3.2.1.E(2) of the BOR; revising the base condition to 214.18 mgd.

(e) The South Dade allocation associated with Elevated Tank, Leisure City, and Naranja is transferred to SMH when the new WTP is planned to begin operation in 2016. Everglades Labor Camp and Newton wellfields are placed in stand by service after the SMHWTP begins planned operations in 2016, with operations limited to minimum amount required to maintain operational readiness and Florida Department of Health clearance. For Everglades Labor Camp and Newton the historical pumpage of 2.8 mgd was increased by 1.5 mgd at Everglades Labor Camp and 0.5 mgd at Newton to 4.8 mgd total, consistent with Section 3.2.1E(2) of the Basis of Review for Water Use Applications within the South Florida Water Management District. Turning off Elevated Tank, Leisure City, and Naranja at 4.3 mgd results in a 2.5 mgd reduction in impact to regional canals, therefore 2.5 mgd is available to transfer to SMH wellfield, plus an additional 0.5 mgd was allowed to account for the reduced treatment efficiency of the proposed membrane softening plant, pursuant to Section 3.2.1E(3)(a).

(f) These proposed facilities are for membrane softening portion of SMH Water Treatment Plant.

EXHIBIT 10A

8/13/2012

Table 4 - MDWASD Floridan Aquifer Wellfields Operation Plan Summary (June 2014) Pumpage by Wellfield

1	2	3	4	5	6	7	8	9	10	11	12
WTP Subarea and Wellfield	Wellfield Data		Individual Wellfield ANNUAL Pumpage / Allocation								Remarks
	Design Capacity (mgd)	Number of Wells	2014 - 2017		2018 - 2025		2026 - 2030		2031 - 2033		
			BG	(mgd)	BG	(mgd)	BG	(mgd)	BG	(mgd)	See Footnote (a)
Hialeah RO WTP [a]	20.00	10	4.855	13.30	4.855	13.30	4.855	13.30	4.855	13.30	
Alexander Orr WTP (Use of Floridan Aquifer Wells for ASR) [b]											
Southwest Wellfield ASR	10.00	2	(1.542)	10.08	(1.542)	10.08	(1.542)	10.08	(1.542)	10.08	See Footnote (b)
			1.522	10.08	1.522	10.08	1.522	10.08	1.522	10.08	
West Wellfield ASR	15.00	3	(2.313)	15.12	(2.313)	15.12	(2.313)	15.12	(2.313)	15.12	
			2.283	15.12	2.283	15.12	2.283	15.12	2.283	15.12	
South Miami Heights WTP (Use of Floridan Aquifer Wells for RO) [c]											
South Miami Heights WTP [c]	24.00	7	0	0.00	8.494	23.27	8.494	23.27	8.494	23.27	See Footnote (c)
MDWASD System Total	69.00	22									
Total Not-To-Exceed Pumpage	Annual Average		4.805	13.30	13.299	36.57	13.299	36.57	13.299	36.57	

Notes

BG = Billion Gallons; MGD = Million Gallons per Day

(a) New Upper Floridan Aquifer RO WTP - Finish water supply of 10.0 mgd, 7.5 mgd Phase 1a by Dec. 31, 2013, 10.0mgd Phase 1b by Dec. 31, 2015. Initial six (6) Floridan aquifer supply wells completed prior to Dec. 31, 2013; the additional four Floridan aquifer supply wells to becompleted prior to Dec. 31, 2015.

(b) Based on 153 days of storage (indicated as negative withdrawal) and 151 days of recovery (positive withdrawal) per ASR well a year. Excludes initial Cycle and Operational Testing of the ASR Wells and ASR Facility UV Disinfection System Testing (Testing is currently underway at Southwest Wellfield ASR and is pending at West Wellfield ASR).

(c) New Upper Floridan Aquifer RO Treatment at South Miami Heights WTP (Finish water supply of 17.45 mgd by Dec. 31, 2018)

Revised June 2014

EXHIBIT 10B

Wholesale Customer Treated Water Deliveries

Entity	Treatment Plant	Deliveries in Millions gallons per fiscal year					
		FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Bal Harbor	Hialeah-Preston	447	466	455	486	430	494
Bay Harbor	Hialeah-Preston	358	329	317	302	310	309
Hialeah	Hialeah-Preston	8081	8110	9103	9598	9121	9429
Hialeah Gardens	Hialeah-Preston	694	695	654	693	591	576
Homestead [1]	Alexander Orr	0	0	0	0	40	151
Indian Creek Village	Hialeah-Preston	133	140	121	133	122	120
Medley	Hialeah-Preston	398	393	400	328	479	516
Miami Beach	Hialeah-Preston	6848	6489	6952	8410	7918	7903
Miami Springs [2]	Hialeah-Preston	771	-	-	-	-	-
North Bay Village	Hialeah-Preston	343	365	395	387	391	415
North Miami	Hialeah-Preston	2123	1502	1175	1331	1374	1655
North Miami Beach [3]	Hialeah-Preston	1013	107	100	-	-	-
Opa-Locka	Hialeah-Preston	909	845	788	887	876	876
Surfside	Hialeah-Preston	327	343	328	317	312	299
Virginia Gardens	Hialeah-Preston	63	100	98	91	93	95
West Miami	Alexander Orr	266	290	293	275	292	236
Water Received from Others		676	386	145	179	152	172

(1) Homestead usage of water is limited to an as needed basis. Their usage is not consistent to that of a wholesale customer.
(2) The City of Miami Springs water system was purchased by WASD and beginning fiscal year 2009, was no longer a wholesale customer. WASD is now providing direct services to customers.
(3) North Miami Beach constructed their own water plant and beginning fiscal year 2009, has not had the need to purchase significant amounts of water.
* Volumes for North Miami Beach reflect total delivered minus water passed thru for Aventura.

EXHIBIT 11
June 2014

Alternative Water Supply Project Development Deadlines Tied to Increased Withdrawal Above the Base Condition Water Use

Project / Milestone	Average Finish Water daily flow	Milestone Completion Date
Hialeah Floridan Aquifer R.O. WTP, Phase 1-a, 10.0 mgd WTP and initial 6 Floridan aquifer supply wells. (7.5 mgd, limited by water supply)	(7.5 mgd)	
• Notice To Proceed Design / Permit		Completed
• Notice To Proceed Construction		Completed
• Turnover / Project Completion		Completed
Hialeah Floridan Aquifer R.O. WTP, Phase 1-b, additional 4 Floridan aquifer supply wells. (10.0 mgd, maximum treatment capacity)	(2.5 mgd)	
• Notice To Proceed Design / Permit		Completed
• Notice To Proceed Construction		Completed
• Turnover / Project Completion		12/31/2015
South Miami Heights WTP (R.O. portion)	(17.45 mgd)	
• Notice To Proceed Design / Permit		Completed
• Notice To Proceed Construction		12/31/2015
• Turnover / Project Completion		12/31/2018

EXHIBIT 13

Revised June 2014

Reuse Projects

Project	Reclaimed water generated from and amount to be treated	Quantity of Reclaimed Wastewater Applied	Reclaimed water used for	Anticipated Completion
1.	North District WWTP (Permitted) **4.44 MGD**	4.44 MGD	2.94 MGD Industrial & 1.5 MGD Public Access	Existing
2.	Central District WWTP (Previous Permitted Limit) **7.84 MGD**	7.84 MGD	Industrial Use Only	Existing
3.	South District WWTP (Previous Permitted Limit) **4.17 MGD**	4.17 MGD	Industrial & Non-Public Access Irrigation	Existing
	TOTAL EXISTING PROJECTS (PERMITTED) = 16.49 MGD			
4.	North District WWTP **9.2 MGD**	9.2 MGD	Floridan aquifer recharge. The scope of these projects is part of the Ocean Outfall legislation implementation plan submitted to the Secretary of FDEP on June 28, 2013.	Dec 31, 2025
5.	Central District WWTP **9.2 MGD**	9.2 MGD		Dec 31, 2025
6.	West District Water Reclamation Plant **9.2 MGD**	9.2 MGD		Dec 31, 2025
7.	South District WWTP **90 MGD**	90 MGD	TPoint Units 5 & 6 cooling TP Unit 7 cooling	Dec 31, 2022 Dec 31, 2023
	TOTAL NEW PROJECTS = 117.5 MGD			Dec 31, 2025

EXHIBIT 14

June 2014

TABLE G (September 2014)
MDWASD PROJECTED RAW AND FINISH WATER DEMAND BY SOURCE

Footnotes

(a) Population Served represents most recent represents the 2010TAZ population projections by the MDC Planning Department.

(b) Annual Average Daily Demand (AADD) Finished Water Projections between 2014 and 2035 assume 137.2 gpcd (a decrease from 145.4 gpcd) total water system demand prior to application of credits (e.g. conservation).

(c) WASD has implemented a 20-year water use efficiency plan and is experiencing reductions in per capita water consumption. Water Conservation projections were revised based on the 2010 Annual Water Conservation Plan Conserve Florida Report (March 2011). Real losses in non-revenue water (e.g. unaccounted-for-water) are assumed to remain at less than 10%. The conservation amounts experienced through 2010 (8.54 MGD) were deducted from the 20-year conservation amount in the Conserve Florida Report and the remaining conservation amounts were distributed for the balance of the 20-year period (2011-2027).

(d) Not Used (TBD).

(e) Adjusted after taking credit in finished water demand projections for reductions in finished water use associated with water conservation.

(f) The Modified Base condition raw water use (349.5 mgd) represents values agreed to by SFWMD and MDWASD and demonstrated by modeling to not cause a net increase in water from the regional canal system. Biscayne Aquifer base condition raw water use allocation of 349.5 mgd (South Dade at 7.1 mgd, North and South at 342.4 mgd) equates to 342.8 mgd of finished water annual average daily demand (AADD).

(g) South Dade (Raw : Finished) Ratio = 1.0 : 1.0

(h) Becomes *stand-by* once SMH WTP starts up. This *stand-by* capacity is not used in the total raw and finished water amounts.

(i) Assumes withdrawals from Elevated Tank, Leisure City, Naranja, Caribbean Park, Former Plant, and Roberta Hunter Park are consolidated. Biscayne Aquifer supplied Membrane Softening (Raw : Finished) Ratio = 1.17 : 1.00 (85% Recovery).

(j) Hialeah-Preston / Alexander-Orr (Raw : Finished) Ratio = 1.060 : 1.00 (Lime Softening)

(k) The values are based on initial cycle testing of the ASR well facilities and the projected seasonal operations of the ASR well facilities at full design capacities with the storing of Biscayne aquifer water during the wet weather months of June through October and the recovery of the stored Biscayne aquifer water during the dry weather months of December through April, assuming an ultimate storage loss of 1.31%.

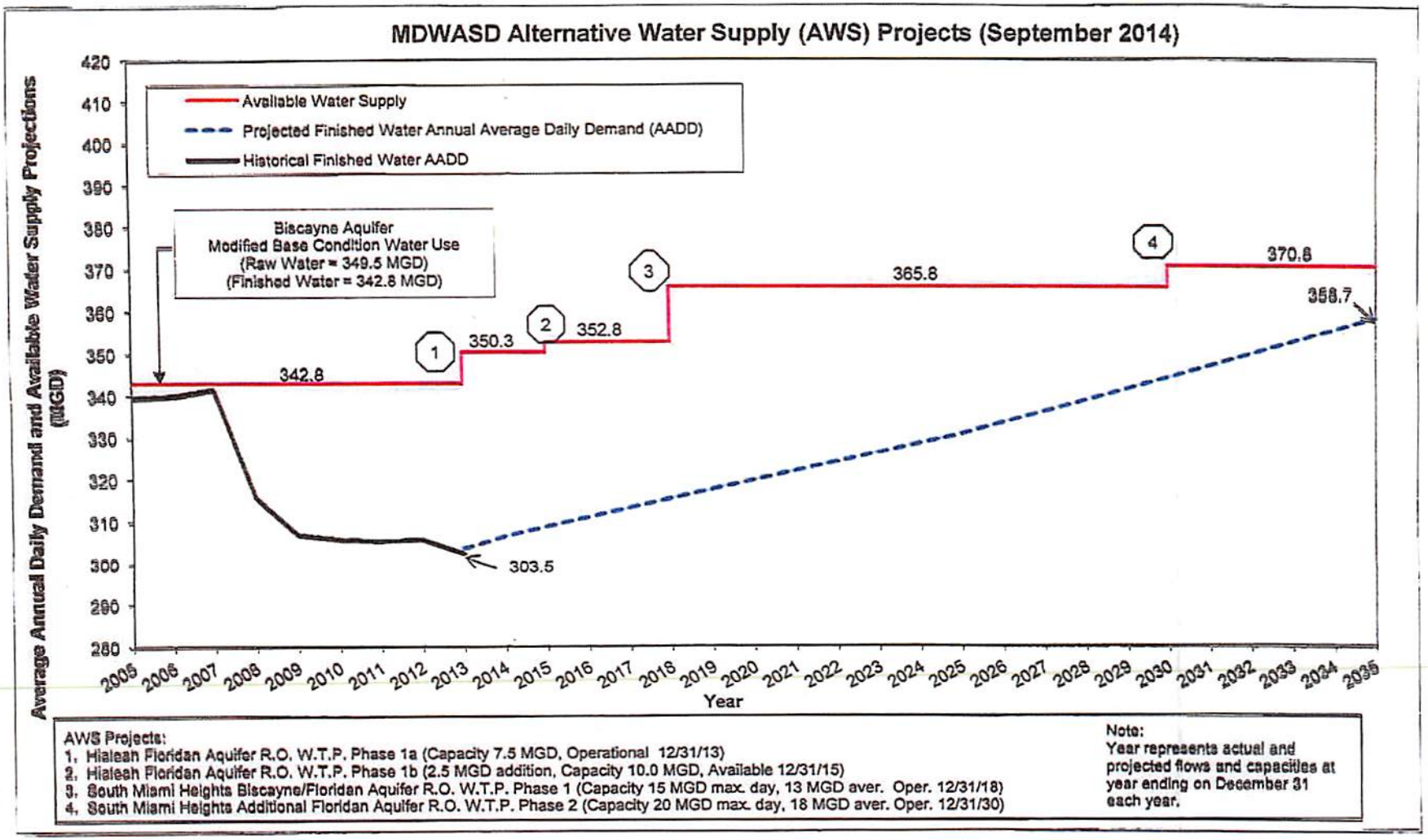
(l) Floridan Aquifer supplied RO WTP (Raw : Finished) Ratio = 1.333 : 1.00 (75% recovery)

(m) At an ultimate 20 mgd plant operating capacity, the raw water withdrawal would be 3.00 MGD from the Biscayne and 23.27 MGD from the Floridan in accordance with the Wellfield Operation Plan. In order to maintain operational flexibility and protect the nanofiltration membranes (Biscayne supply), MDWASD is requesting that the WTP be allowed to operate with up to a constant supply of 3.0 MGD from the Biscayne aquifer and the rest, to meet demand, be provided from the Floridan aquifer. The full use of the small Biscayne aquifer allocation at SMH supplemented by Floridan aquifer water will allow a blended finished water product that is expected to be lower in sodium and chloride, which will be beneficial to customers on low sodium diets, and more will require less chemical addition for product water stabilization.

(n) An additional 0.62 MGD of Raw Water AADD has been included in year 2033 for Hialeah-Preston / Alexander Orr Lime Softening to maintain the total Biscayne aquifer Modified Base condition raw water use at 349.5 mgd and to provide needed operational flexibility in withdrawals of Floridan aquifer water.

EXHIBIT 8B

EXHIBIT 9



Alternative Water Supply Projects Step Chart September 2014

Table 4 - MDWASD Floridan Aquifer Wellfields Operation Plan Summary (September 2014) Pumpage by Wellfield

1	2	3	4	5	6	7	8	9	10
WTP Subarea and Wellfield	Wellfield Data		Individual Wellfield ANNUAL Pumpage / Allocation						Remarks
	Design Capacity (mgd)	Number of Wells	2014 - 2017		2018 - 2030		2031 - 2033		
			BG	(mgd)	BG	(mgd)	BG	(mgd)	
Hialeah RO WTP [a]	20.00	10	4.855	13.30	4.855	13.30	4.855	13.30	See Footnote (a)
Alexander Orr WTP (Use of Floridan Aquifer Wells for ASR) [b]									
Southwest Wellfield ASR	10.00	2	(1.542)	10.08	(1.542)	10.08	(1.542)	10.08	See Footnote (b)
			1.522	10.08	1.522	10.08	1.522	10.08	
West Wellfield ASR	15.00	3	(2.313)	15.12	(2.313)	15.12	(2.313)	15.12	
			2.283	15.12	2.283	15.12	2.283	15.12	
South Miami Heights WTP (Use of Floridan Aquifer Wells for RO) [c]									
South Miami Heights WTP [c]	24.00	7	0	0.00	6.059	16.60	8.494	23.27	See Footnote (c)
MDWASD System Total	69.00	22							
Total Not-To-Exceed Pumpage	Annual Average		4.805	13.30	10.864	29.90	13.299	36.57	

Notes

BG = Billion Gallons; MGD = Million Gallons per Day

(a) New Upper Floridan Aquifer RO WTP - Finish water supply of 10.0 mgd, 7.5 mgd Phase 1a by Dec. 31, 2013, 10.0mgd Phase 1b by Dec. 31, 2015. Initial six (6) Floridan aquifer supply wells completed prior to Dec. 31, 2013; the additional four Floridan aquifer supply wells to becompleted prior to Dec. 31, 2015.

(b) Based on 153 days of storage (indicated as negative withdrawal) and 151 days of recovery (positive withdrawal) per ASR well a year. Excludes Initial Cycle and Operational Testing of the ASR Wells and ASR Facility UV Disinfection System Testing (Testing is currently underway at Southwest Wellfield ASR and is pending at West Wellfield ASR).

(c) New Upper Floridan Aquifer RO Treatment at South Miami Heights WTP (Phase 1 Finish water supply of 12.45 mgd by Dec. 31, 2018 with Phase 2 total Finish water supply of 17.45 mgd by Dec. 31, 2030)

Revised September 2014

EXHIBIT 10B

Alternative Water Supply Project Development

Project / Milestone	Average Finish Water daily flow	Milestone Completion Date
Hialeah Floridan Aquifer R.O. WTP, Phase 1-a, 10.0 mgd WTP and initial 6 Floridan aquifer supply wells. (7.5 mgd, limited by water supply)	(7.5 mgd)	
• Notice To Proceed Design / Permit		Completed
• Notice To Proceed Construction		Completed
• Turnover / Project Completion		Completed
Hialeah Floridan Aquifer R.O. WTP, Phase 1-b, additional 4 Floridan aquifer supply wells. (10.0 mgd, maximum treatment capacity)	(2.5 mgd)	
• Notice To Proceed Design / Permit		Completed
• Notice To Proceed Construction		Completed
• Turnover / Project Completion		12/31/2015
South Miami Heights WTP (R.O. portion) Phase 1	(12.45 mgd)	
• Notice To Proceed Design / Permit		Completed
• Notice To Proceed Construction		12/31/2015
• Turnover / Project Completion		12/31/2018
South Miami Heights WTP (R.O. addition) Phase 2	(5.0 mgd)	
• Notice To Proceed Design / Permit		Completed
• Notice To Proceed Construction		12/31/2028
• Turnover / Project Completion		12/31/2030

EXHIBIT 13

Revised September 2014

Reuse Projects

Project	Reclaimed water generated from and amount to be treated	Quantity of Reclaimed Wastewater Applied	Reclaimed water used for	Anticipated Completion
1.	North District WWTP (Permitted) 4.44 MGD	4.44 MGD	2.94 MGD Industrial & 1.5 MGD Public Access	Existing
2.	Central District WWTP (Previous Permitted Limit) 7.84 MGD	7.84 MGD	Industrial Use Only	Existing
3.	South District WWTP (Previous Permitted Limit) 4.17 MGD	4.17 MGD	Industrial & Non-Public Access Irrigation	Existing
	TOTAL EXISTING PROJECTS (PERMITTED) = 16.49 MGD			
4.	South District WWTP 9.2 MGD	9.2 MGD	Floridan aquifer recharge. The scope of these projects is part of the Ocean Outfall legislation implementation plan submitted to the Secretary of FDEP on June 28, 2013.	Dec 31, 2025
5.	Central District WWTP 9.2 MGD	9.2 MGD		Dec 31, 2025
6.	West District Water Reclamation Plant 9.2 MGD	9.2 MGD		Dec 31, 2025
7.	South District WWTP 90 MGD	90 MGD	TPoint Units 5 & 6 cooling TP Unit 7 cooling	Dec 31, 2022 Dec 31, 2023
	TOTAL NEW PROJECTS = 117.6 MGD			Dec 31, 2025

EXHIBIT 14
September 2014

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Regulation Division

July 25, 2014

Juan Carlos Arteaga, AIA
Miami-Dade County Water and Sewer Department
P.O. Box 330316
Miami, FL 33233-0316

Subject: Miami-Dade County Water and Sewer Department
Water Use Permit Application No. 140627-12, Permit No. 13-00017-W
Miami-Dade County

Dear Mr. Arteaga:

District staff have reviewed the above-referenced application. As discussed with Bertha Goldenberg on July 24, 2014, the District is requesting the following information, in accordance with Section 40E-1.603, Florida Administrative Code (F.A.C.), to complete the application and provide reasonable assurances for permit issuance:

1. For the requested modification to Limiting Condition 28, please provide a description of the conditions and typical operating plan when withdrawals would exceed 15 million gallons per day and how the proposed operating plan is consistent with Exhibit 35. Please be advised that any increase in withdrawals over 15 million gallons per day will require a hydrogeologic evaluation of potential impacts to sensitive environmental features (Section 2.2.2 of the Applicants Handbook for Water Use Permit Applications [AH]).

2. The requested modification to Limiting Condition 49 proposes to change the wording in the second paragraph from "In the event that water losses, as defined by the AWWA method (Exhibit 16B), exceed 10 percent..." to "In the event that water losses, as defined by Section 5.2.1.E of the Basis of Review..." This section of the Basis of Review (BOR) refers to maintaining an accurate flow meter at the intake of the water treatment plant.

   You may be aware that the District is now using the Applicant's Handbook, dated July 16, 2014. Please indicate which section of the AH you are referring to and any proposed changes to the water loss reporting resulting from the requested change. Please note that the District would prefer all public water supply entities to report losses defined by the AWWA method (Section 2.3.2.F.2.c, of the AH).

3. Regarding the proposed changes to Limiting Condition 45, please provide a more detailed schedule (i.e. scheduled meetings, progress reports) of the proposed process for the development of an alternate reuse project in the event the parties do not reach agreement on the feasibility of the Biscayne Bay Coastal Wetlands project by August 15, 2014 (Section 2.2.4 of the AH).

Advisory Comment: The following comments are advisory in nature and do not require a response from the applicant to complete the application. However, satisfactory resolution of these issues is required for staff to recommend approval.

District staff is concerned that Exhibit 14 shows significantly less proposed reuse water projects than Exhibit 14 in the active permit. Please consider modifying this Exhibit to include the Biscayne Bay Coastal Wetlands Rehydration Project (or Potential Alternate Reuse Project), consistent with the proposed Limiting Condition 45.

Please submit responses to this letter electronically on the District's ePermitting website (www.sfwmd.gov/epermitting) using the Additional Submittals link to expedite administrative processing of the application and to save paper. Please note that an electronic response may be submitted even if the original application was submitted via hard copy. Information regarding the District's comprehensive ePermitting program is enclosed. Alternatively, please provide one (1) original and one (1) copy of the requested information, clearly labeled with the application number, to District Headquarters.

In accordance with paragraph 40E-1.603(1)(b) F.A.C., if the requested information is not received within 90 days of the date of this letter, this application may be processed for denial, if not withdrawn by the applicant. If additional time is needed, please contact one of the District staff members below with a request for an extension before the 90 day period ends.

The District recommends contacting the assigned staff members to resolve the above questions and concerns prior to submitting a response. John Lockwood, Lead Hydrogeologist at 561-682-6884, or via email at jlockwo@sfwmd.gov is available to assist with questions.

Sincerely,

Jonathan E. Shaw, P.G.
Section Leader, Water Use Bureau
South Florida Water Management District

JS/jl

Enclosure

cc: Applicant/Owner
Consultant
Other interested parties (if any)

MDWASD 20-YEAR Water Use Permit
July 16, 2012 Modification

FORM 80228
Rev. 07/08

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
WATER USE PERMIT NO. RE-ISSUE 13-00017-W
NON-ASSIGNABLE

Date Issued: July 16, 2012 **Expiration Date:** December 16, 2030

Authorizing: THE INCREASED USE OF GROUND WATER FROM THE UPPER FLORIDAN AQUIFER AND BISCAYNE AQUIFER FOR PUBLIC WATER SUPPLY FOR COUNTY WIDE SYSTEM SERVING 2,787,451 PERSONS IN THE YEAR 2030 WITH AN AVERAGE PER CAPITA USE RATE OF 147 GALLONS PER DAY AND A MAXIMUM MONTHLY TO AVERAGE MONTHLY PUMPING RATIO 1.06 WITH AN ANNUAL ALLOCATION OF 149,906.00 MILLION GALLONS.

Located In: Miami-Dade County, S-/T53S/R39E (SEE ATTACHED FOR ADDITIONAL SECTIONS, TOWNSHIPS S-/T53S/R40E AND RANGES)

Issued To: MIAMI-DADE WATER AND SEWER DEPARTMENT
(MIAMI-DADE CONSOLIDATED PWS)
P O BOX 330316,
MIAMI, FL 33233-0316

This is to notify you of the District's agency action concerning Permit Application No. 110511-6, dated May 3, 2011. This action is taken pursuant to the provisions of Chapter 373, Part II, Florida Statutes (F.S.), Rule 40E-1.603 and Chapter 40E-2, Florida Administrative Code (F.A.C.). Based on the information provided, District rules have been adhered to and a Water Use Permit is in effect for this project subject to:

1. Not receiving a filed request for an administrative hearing pursuant to Section 120.57 and Section 120.569, or request a judicial review pursuant Section 120.68, Florida Statutes.
2. The attached 52 Limiting Conditions.
3. The attached 37 exhibits.

Permittee agrees to hold and save the South Florida Water Management District and its successors harmless from any and all damages, claims or liabilities which may arise by reason of the construction, maintenance or use of activities authorized by this permit. Said application, including all plan and specifications attached thereto, is by reference made a part hereof.Upon written notice to permittee, this permit may be temporarily modified, or restricted under a Declaration of Water Shortage or a Declaration of Emergency due to Water Shortage in accordance with provisions of Chapter 373, Fla. Statutes, and applicable rules and regulations of the South Florida Water Management District. This Permit may be permanently or temporarily revoked, in whole or in part, for the violation of the conditions of the permit or for the violation of any provision of the Water Resources Act and regulations thereunder. This Permit does not convey to the permittee any property rights nor any privileges other than those specified herein, nor relieve the permittee from complying with any law, regulation, or requirement affecting the rights of other bodies or agencies.

Should you object to these conditions, please refer to the attached "Notice of Rights" which addresses the procedures to be followed if you desire a public hearing or other review of the proposed agency action. Should you wish to object to the proposed agency action or file a petition or request, please provide written objections, petitions, requests and/or waivers to:

Elizabeth Veguilla, Deputy Clerk, MSC2440
South Florida Water Management District
Post Office Box 24680
West Palm Beach, FL 33416-4680

Please contact this office if you have any questions concerning this matter. If we do not hear from you in accordance with the "Notice of Rights", we will assume that you concur with the District's action.

CERTIFICATION OF SERVICE

I HEREBY CERTIFY that the Staff Report, Conditions and Notice of Rights have been mailed to the Permittee (and the persons listed on the attached staff report distribution list) no later than 5:00 p.m. on this 17th day of July, 2012, in accordance with Section 120.60(3), Florida Statutes, and a copy has been filed and acknowledged with the Deputy District Clerk.

By _____
DEPUTY CLERK
SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Attachments

LIMITING CONDITIONS

1. This permit shall expire on December 16, 2030.

2. Application for a permit modification may be made at any time.

3. Water use classification:

   Public water supply
   Aquifer storage and Recovery

4. Source classification is:

   Ground Water from:
   Biscayne Aquifer
   Upper Floridan Aquifer

5. Annual allocation shall not exceed 149906 MG.

   Maximum monthly allocation shall not exceed 13117 MG.

   The following limitations to the average annual withdrawals from specific sources are applicable through December 31, 2021:
   Biscayne aquifer: 127,568 MG
   Floridan aquifer: 17,031 MG

   The following limitations to the average annual withdrawals from specific sources are applicable from January 1, 2022 through December 31, 2026:
   Biscayne aquifer: 135,233 MG
   Floridan aquifer: 17,031 MG
   Reuse offset: 7,665 MG (21 MGD SWWF recharge)

   The following limitations to the average annual withdrawals from specific sources are applicable from January 1, 2027 through December 31,2030:
   Biscayne aquifer: 141,073 MG
   Floridan aquifer: 17,009 MG
   Reuse offset: 13,505 MG (37 MGD SWWF recharge)

   The allocations are further constrained by the wellfield operational plan described in Limiting Condition 27. Reuse offsets are required for withdrawals above 109.4 MGD at the SWWF. The offset reuse volumes do not include other reuse projects outlined in Limiting Condition 39, which are in addition to the wellfield recharge project.

6. Pursuant to Rule 40E-1.6105, F.A.C., Notification of Transfer of Interest in Real Property, within 30 days of any transfer of interest or control of the real property at which any permitted facility, system, consumptive use, or activity is located, the permittee must notify the District, in writing, of the transfer giving the name and address of the new owner or person in control and providing a copy of the instrument effectuating the transfer, as set forth in Rule 40E-1.6107, F.A.C.

   Pursuant to Rule 40E-1.6107 (4), until transfer is approved by the District, the permittee shall be liable for compliance with the permit. The permittee transferring the permit shall remain liable for all actions that are required as well as all

violations of the permit which occurred prior to the transfer of the permit.

Failure to comply with this or any other condition of this permit constitutes a violation and pursuant to Rule 40E-1.609, Suspension, Revocation and Modification of Permits, the District may suspend or revoke the permit.

This Permit is issued to:

Miami-Dade Water and Sewer Department
3071 Sw 38th Ave
Miami, FL 33146
Attn: Utility Director

7. Withdrawal Facilities:

Ground Water - Proposed:

3 - 24" X 72' X 1400 GPM Wells Cased To 45 Feet
1 - 24" X 50' X 1400 GPM Well Cased To 45 Feet
7 - 24" X 1200' X 2430 GPM Wells Cased To 1100 Feet
1 - 24" X 50' X 2800 GPM Well Cased To 45 Feet
7 - 17" X 1490' X 1400 GPM Wells Cased To 1080 Feet

Ground Water - Existing:

20 - 14" X 115' X 2500 GPM Wells Cased To 80 Feet
4 - 24" X 100' X 4900 GPM Wells Cased To 35 Feet
2 - 24" X 100' X 7500 GPM Wells Cased To 50 Feet
1 - 24" X 70' X 3470 GPM Well Cased To 35 Feet
1 - 18" X 65' X 1500 GPM Well Cased To 50 Feet
1 - 12" X 35' X 800 GPM Well Cased To 30 Feet
1 - 18" X 55' X 1500 GPM Well Cased To 42 Feet
6 - 42" X 107' X 7000 GPM Wells Cased To 66 Feet
1 - 18" X 55' X 1500 GPM Well Cased To 45 Feet
1 - 42" X 68' X 8500 GPM Well Cased To 60 Feet
2 - 24" X 70' X 6945 GPM Wells Cased To 35 Feet
1 - 16" X 50' X 1600 GPM Well Cased To 40 Feet
4 - 24" X 108' X 8300 GPM Wells Cased To 50 Feet
2 - 12" X 40' X 1600 GPM Wells Cased To 35 Feet
1 - 16" X 100' X 7500 GPM Well Cased To 40 Feet
3 - 48" X 88' X 7500 GPM Wells Cased To 33 Feet
6 - 17" X 1490' X 1400 GPM Wells Cased To 1080 Feet
1 - 48" X 80' X 10416.67 GPM Well Cased To 46 Feet
1 - 30" X 1200' X 3500 GPM Well Cased To 760 Feet
1 - 30" X 1250' X 3500 GPM Well Cased To 845 Feet
1 - 30" X 1210' X 3500 GPM Well Cased To 835 Feet
4 - 24" X 104' X 6940 GPM Wells Cased To 54 Feet
6 - 20" X 100' X 4900 GPM Wells Cased To 40 Feet
1 - 18" X 50' X 500 GPM Well Cased To 40 Feet
1 - 12" X 40' X 800 GPM Well Cased To 35 Feet
1 - 18" X 66' X 1500 GPM Well Cased To 53 Feet
1 - 42" X 107' X 7000 GPM Well Cased To 69 Feet
1 - 42" X 68' X 10000 GPM Well Cased To 60 Feet
1 - 42" X 68' X 8500 GPM Well Cased To 54 Feet

7 - 16" X 100' X 4170 GPM Wells Cased To 40 Feet
1 - 42" X 68' X 10000 GPM Well Cased To 54 Feet
1 - 14" X 115' X 3800 GPM Well Cased To 80 Feet
1 - 30" X 1300' X 3500 GPM Well Cased To 850 Feet
1 - 17" X 1490' X 1400 GPM Well Cased To 1150 Feet
1 - 6" X 30' X 400 GPM Well Cased To 25 Feet
1 - 30" X 1200' X 3500 GPM Well Cased To 765 Feet
4 - 40" X 100' X 10420 GPM Wells Cased To 57 Feet
1 - 30" X 115' X 4170 GPM Well Cased To 80 Feet
1 - 30" X 115' X 2500 GPM Well Cased To 80 Feet
1 - 12" X 35' X 1200 GPM Well Cased To 30 Feet
10 - 48" X 80' X 10420 GPM Wells Cased To 46 Feet

8. Permittee shall mitigate interference with existing legal uses that was caused in whole or in part by the permittee's withdrawals, consistent with the approved mitigation plan. As necessary to offset the interference, mitigation will include pumpage reduction, replacement of the impacted individual's equipment, relocation of wells, change in withdrawal source, or other means.

   Interference to an existing legal use is defined as an impact that occurs under hydrologic conditions equal to or less severe than a 1 in 10 year drought event that results in the:

   (1) Inability to withdraw water consistent with provisions of the permit, such as when remedial structural or operational actions not materially authorized by existing permits must be taken to address the interference; or

   (2) Change in the quality of water pursuant to primary State Drinking Water Standards to the extent that the water can no longer be used for its authorized purpose, or such change is imminent.

9. Permittee shall mitigate harm to existing off-site land uses caused by the permittee's withdrawals, as determined through reference to the conditions for permit issuance. When harm occurs, or is imminent, the District will require the permittee to modify withdrawal rates or mitigate the harm. Harm caused by withdrawals, as determined through reference to the conditions for permit issuance, includes:

   (1) Significant reduction in water levels on the property to the extent that the designed function of the water body and related surface water management improvements are damaged, not including aesthetic values. The designed function of a water body is identified in the original permit or other governmental authorization issued for the construction of the water body. In cases where a permit was not required, the designed function shall be determined based on the purpose for the original construction of the water body (e.g. fill for construction, mining, drainage canal, etc.)

   (2) Damage to agriculture, including damage resulting from reduction in soil moisture resulting from consumptive use; or

   (3) Land collapse or subsidence caused by reduction in water levels associated with consumptive use.

10. Permittee shall mitigate harm to the natural resources caused by the permittee's withdrawals, as determined through reference to the conditions for permit issuance. When harm occurs, or is imminent, the District will require the permittee to modify withdrawal rates or mitigate the harm. Harm, as determined through reference to the conditions for permit issuance includes:

    (1) Reduction in ground or surface water levels that results in harmful lateral movement of the fresh water/salt water interface,

    (2) Reduction in water levels that harm the hydroperiod of wetlands,

(3) Significant reduction in water levels or hydroperiod in a naturally occurring water body such as a lake or pond,

(4) Harmful movement of contaminants in violation of state water quality standards, or

(5) Harm to the natural system including damage to habitat for rare or endangered species.

11. If any condition of the permit is violated, the permit shall be subject to review and possible modification, enforcement action, or revocation.

12. Authorized representatives of the District shall be permitted to enter, inspect, and observe the permitted system to determine compliance with special conditions.

13. The Permittee is advised that this permit does not relieve any person from the requirement to obtain all necessary federal, state, local and special district authorizations.

14. The permit does not convey any property right to the Permittee, nor any rights and privileges other than those specified in the Permit and Chapter 40E-2, Florida Administrative Code.

15. Permittee shall submit all data as required by the implementation schedule for each of the limiting conditions to: SFWMD, Regulatory Support Division, MSC 9611, P.O. Box 24680, West Palm Beach, FL 33416-4680.

16. In the event of a declared water shortage, water withdrawal reductions will be ordered by the District in accordance with the Water Shortage Plan, Chapter 40E-21, F.A.C. The Permittee is advised that during a water shortage, pumpage reports shall be submitted as required by Chapter 40E-21, F.A.C.

17. Prior to the use of any proposed water withdrawal facility authorized under this permit, unless otherwise specified, the Permittee shall equip each facility with a District-approved operating water use accounting system and submit a report of calibration to the District, pursuant to Section 4.1, Basis of Review for Water Use Permit Applications.

    In addition, the Permittee shall submit a report of recalibration for the water use accounting system for each water withdrawal facility (existing and proposed) authorized under this permit every five years from each previous calibration, continuing at five-year increments.

18. Monthly withdrawals for each withdrawal facility shall be submitted to the District quarterly. The water accounting method and means of calibration shall be stated on each report.
    The permittee shall report injection/withdrawals from the ASR wells in the following manner:

    Biscayne aquifer water injected
    Biscayne aquifer water recovered
    Floridan aquifer withdrawal

19. The Permittee shall provide annual status reports to the District that summarize the ASR cycle testing activities. The first report shall be submitted by:
    March 15, 2013

20. The Permittee shall notify the District within 30 days of any change in service area boundary. If the Permittee will not

serve a new demand within the service area for which the annual allocation was calculated, the annual allocation may then be subject to modification and reduction.

21. The Permittee shall submit to the District an updated Well Description Table (Table A) within one month of completion of the proposed wells identifying the actual total and cased depths, pump manufacturer and model numbers, pump types, intake depths and type of meters.

22. Permittee shall secure a well construction permit prior to construction, repair, or abandonment of all wells, as described in Chapters 40E-3 and 40E-30, Florida Administrative Code.

23. Every ten years from the date of permit issuance, the permittee shall submit a water use compliance report for review and approval by District Staff, which addresses the following:

    1. The results of a water conservation audit that documents the efficiency of water use on the project site using data produced from an onsite evaluation conducted. In the event that the audit indicates additional water conservation is appropriate or the per capita use rate authorized in the permit is exceeded, the permittee shall propose and implement specific actions to reduce the water use to acceptable levels within timeframes proposed by the permittee and approved by the District.

    2. A comparison of the permitted allocation and the allocation that would apply to the project based on current District allocation rules and updated population and per capita use rates. In the event the permit allocation is greater than the allocation provided for under District rule, the permittee shall apply for a letter modification to reduce the allocation consistent with District rules and the updated population and per capita use rates to the extent they are considered by the District to be indicative of long term trends in the population and per capita use rates over the permit duration. In the event that the permit allocation is less than allowable under District rule, the permittee shall apply for a modification of the permit to increase the allocation if the permittee intends to utilize an additional allocation, or modify its operation to comply with the existing conditions of the permit.

    3. Summary of the current and previous nine years progress reports for implementation of the Alternative Water Supply Plan and any modifications necessary to continue to meet the Plan requirements and conditions for issuance.

    4. Information demonstrating that the conditions for issuance of the permit are being complied with, pursuant to Limiting Condition # 51 and Section 373.236, F.S.

    5. Updates or amendments to the County's reuse plan.

24. In order to promote use of alternative water supplies, pumpage from Floridan aquifer wells and from those Biscayne aquifer wells whose use is offset by reclaimed water will be conducted on a priority basis, referred to as a "first on, last off" priority. Changes to wellfield operations must be approved via modification of the approved Wellfield Operation Plan by District staff prior to implementation.

25. The permittee shall operate surface water control structure known as the Mid-canal structure and bridge in accordance with the approved operational plan included in Exhibit 22. In addition, whenever this structure is opened for the purpose of raising water in the Wellfield Protection Canal down stream of the structure, the upstream structure that delivers water from the L-30 canal shall be opened in a manner to deliver equal volumes to those passed through the Mid-canal structure and bridge. The permittee shall submit operation and flow data logs regarding both structures to the District quarterly.

26. The Permittee is authorized to exercise the emergency wells at the Medley Wellfield for a total of two hours per month as needed for bacterial clearance and pump maintenance. Operation of the emergency wells at the Medley Wellfield for more than this amount shall require prior approval from SFWMD. Pumpage data shall be collected and report in accordance with Limiting Condition 18.

27. Permittee shall implement the wellfield operating plan described in District staff report prepared in support of recommendation for permit issuance.
See Exhibit 10

28. No more than 15 MGD shall be withdrawn from the West Biscayne aquifer Wellfield on any given day.

29. No more than 25,550 MGY shall be withdrawn during any 12 month consecutive period from the combined Hialeah, Preston and Miami Springs Biscayne aquifer wellfields

30. No more than 7,993 MGY shall be withdrawn during any 12 month consecutive period from the Snapper Creek Wellfield unless reclaimed water recharge is implemented in locations and amounts necessary to offset the impact of the increase to Everglades water bodies per limiting conditions 39 and 41.

31. No more than 39,931 MGY shall be withdrawn during any 12 month consecutive period from the Southwest Biscayne aquifer Wellfield unless reclaimed water recharge is implemented in locations and amounts necessary to offset the impact of the increase to Everglades water bodies per limiting conditions 39 and 41.

32. No more than 67,999 MGY shall be withdrawn during any 12 month consecutive period from the combined West, Southwest Snapper Creek and Alexander Orr Biscayne aquifer wellfields unless reclaimed water recharge is implemented in locations and amounts necessary to offset the impact of the increase to Everglades water bodies per limiting conditions 39 and 41.

33. No more than 1,095 MGY shall be withdrawn during any 12 month consecutive period from the South Miami Heights Wellfield.

34. No more than 1,752 MGY shall be withdrawn during any 12 month consecutive period from the combined Everglades Labor Camp and Newton wellfields.

35. No more than 1,571 MGY shall be withdrawn during any 12 month consecutive period from the combined Elevated Tank, Leisure City and Naranja wellfields.

36. The Permittee shall continue to submit monitoring data in accordance with the approved water level monitoring program for this project.
The existing monitoring program is described in Exhibits 30 and 32B.

37. The Permittee shall continue to submit monitoring data in accordance with the approved saline water intrusion monitoring program for this project.
See exhibits 28A and 32B for a list of monitor wells and and required sampling schedule.
The permittee shall submit annual Monitoring Program summary reports. The annual report will summarize the status of the project to update the salt front and install new monitor wells.

38. Within six months of permit issuance, an executed large user water agreement with the City of Hialeah shall be submitted to the District. In the event that the final agreement is for volumes less than those used in the formulation of the allocations in this permit, the allocations shall be reduced through a letter modification.

39. The permittee shall implement a minimum of 170 MGD of reuse projects as set forth in Projects 1-8 of Exhibit 14 on or before the deadlines provided therein. The exact volume of reclaimed water applied will depend on the treatement losses resulting from the process that are implemented. In the event any of these projects do not require or allow as much reuse as anticipated, the County shall identify and implement other reuse projects that will provide provide beneficial reuse of water by the deadlines set forth in Exhibit 14. Any changes to Exhibit 14 must be reviewed and approved by the District in consultation with the FDEP in accordance with Parts I & II of Chapter 373, Florida Statutes, and District rules governing consumptive uses of water in Chapter 40E-2, F.A.C., and FDEP rules governing the treatment and use of reclaimed water in Chapter 62-610, F.A.C.

40. The permittee will develop alternative water supplies in accordance with the schedules described in Exhibit 13.

The permittee will provide annual updates of the status of all alternative water supply projects (per the timeframes contained in Limiting Condition 50). The status report shall include work completed to date, expenditures and any anticipated changes in the timelines.

41. In the event that a milestone specified in the alternative water supply schedule and plan contained in Exhibit 13 is going to be missed, the permittee shall notify the Executive Director of the District in writing explaining the nature of the delay, actions taken to bring the project back on schedule and an assessment of the impact the delay would have on the rates of withdrawals from the Everglades water bodies and associated canals as defined in SFWMD consumptive use permitting rules. The District will evaluate the situation and take actions as appropriate which could include: a.) granting an extension of time to complete the project (if the delay is minor and doesn't affect the Everglades Waterbodies or otherwise violates permit conditions), b.) take enforcement actions including consent orders and penalties, c.) modify allocations contained in this permit from the Biscayne aquifer including capping withdrawal rates until the alternative water supply project(s) are completed (in cases where the delay would result in violations of permit conditions) or d.) working with the Department of Community Affairs to limit increase demands for water until the alternative water supply project is completed.

42. The Permittee shall provide the District with annual updates by March 15th each year describing the activities associated with the implementation of their approved reuse feasibility plan including the following information: (1) the status of distribution system construction, including location and capacity of a) existing reuse lines b) proposed reuse lines to be constructed in the next five years; (2) a summary of uncommitted supplies for the next five years; (3) the status of reuse plan implementation including status of pilot projects, plan design construction, volume of reuse available, volume of wastewater disposed of; and (4) the status/copies of any ordinances related to reuse (5) any proposed changes to the reuse plan set forth in Exhibit 14. The first annual update is due March 15, 2013.

43. Reuse Project numbers 5 and 6 in Exhibit 14 for wellfield recharge, which must be in place and operating prior to any additional withdrawals from the wellfield over the base condition water use as identified in Exhibit 10.

44. July 1, 2013, the Permittee shall submit a report for District review and approval identifying the location, treatment, timing and volume for Reuse Projects 5 & 6 on Exhibit 14 which provide groundwater recharge for the Southwest Wellfield. The report shall demonstrate that the proposed recharge sites and operations shall at a minimum prevent increased withdrawals from the C-4, C-2 and eastward groundwater seepage from Everglades National Park over the base condition water use and is otherwise a beneficial reuse of water per Chapter 62-610, F.A.C.

45. For Reuse Project number 4 of Exhibit 14 for rehydration of Biscayne Coastal Wetlands, in consultation with the District, the FDEP and Biscayne Bay National Park, upon completion of the pilot testing program, the parties shall agree on the water quality treatment required and the feasibility, as defined in Section 3.2.3.2 of the Basis of Review for Water Use, of this project on or before January 15, 2014. Extension of this deadline may be issued in writing by the District upon demonstration of good cause such as events beyond the control of the permittee or after consideration of the results/data collected, the District determines that additional testing is necessary. In determining the water quality needed, the parties will consider State and Federal water quality discharge standards, the volume and timing of water to be delivered to Biscayne Bay and the location of delivery. In the event the parties do not reach agreement on the feasibility by January 15, 2014, the Permittee shall begin development of an alternate reuse project from the South District wastewater facility and shall provide the District with a proposal for an alternate project including a conceptual design and schedule for implementation on or before December 15, 2014.

46. The permittee may request temporary authorization from the District to capture and store stormwater via withdrawals from the permitted Biscayne aquifer production wells, for storage within the Floridan aquifer system consistent with their FDEP issued Underground Injection Control permits.The District will consider the availability of stormwater that is not otherwise needed for environmental protection or enhancement and is in no way bound to authorize such requests. All such requests shall be made in writing to the Director of Water Use Regulation.

47. Permittee shall maintain an accurate flow meter at the intake of the water treatment plant for the purpose of measuring daily inflow of water.

Permittee shall maintain a calibrated flow meter(s) at the intake (raw water) and discharge (treated water) points within the Hialeah/Preston, Alexander Orr, and proposed Hialeah RO and South Miami Heights water treatment plants for the purpose of measuring treatment losses and shall submit monthly data quarterly as required pursuant to Limited Condition 18.

48. The Water Conservation Plan required by Section 2.6.1 of the Basis of Review for Water Use Permit Applications within the South Florida Water Management District, must be implemented in accordance with the approved implementation schedule.

    The Water Conservation Plan is contained in Exhibit 18. The permittee shall submit an annual report covering water conservation activities during the prior calendar year by March 15 of each year describing water conservation activities for the year including expenditures, projects undertaken and estimated water savings.

49. Permittee shall determine unaccounted-for distribution system losses on a quarterly basis and report the findings on an annual basis. The losses shall be determined for the entire system and for each of the water treatment plants (comparing water pumped from the wells compared to the volume into and out of the treatment plant), utilizing the most recent, approved water accounting and International Water Association / American Water Works Association (IWA/AWWA) water audit methodologies. The permittee shall verify the IWA/AWWA water audit methods to be used with the District for the subsequent year in each annual report. The annual report shall cover activities during the prior calendar year and be submitted on April 15 of each year. In addition to the unaccounted-for loss data, the report shall include the status of the activities (actions and expenditures along with the associated water savings) completed during the year to implement the approved water loss reduction plan (Exhibit 17).

    In the event that the water losses, as defined by the AWWA method (Exhibit 16B), exceed 10 percent, the permittee shall include in the annual report a description of additional actions which will be implemented the following year(s) to reduce the losses to less than ten percent. If the District concludes that the progress towards achieving losses of less than 10 percent as identified in the unaccounted for losses plan is inconsistent with the plan schedule, the Permittee shall be required to revise the plan, to be approved by the District.

50. All annual reports required in these limiting conditions shall address activities that occurred during a calendar year and shall be submitted to Water Use Compliance on or before April 15th of the following year.

51. If it is determined that the conditions for permit issuance are no longer met for the 20 year permit duration, the permittee shall obtain a modification of the Permit from the District as necessary to come into compliance with the conditions for permit issuance. Such conditions for permit issuance include minimum flows and levels, water reservations, and other conditions ensuring the use does not cause water resource harm and is consistent with the objectives of the District, including implementation of the Comprehensive Everglades Restoration Plan.

52. The permittee shall operate the West Wellfield in accordance with the Memorandum of Understanding between the U.S. Department of the Interior, the Governor of the State of Florida, Miami Dade County and the District incorporated in Exhibit 35.

Permit No. 13-00017-W
Application No. 110511-6
Miami-Dade County

S-/T53S/R41E
S-/T54S/R39E
S-/T54S/R40E
S-/T54S/R41E
S-/T54S/R42E
S-/T55S/R39E
S-/T55S/R40E
S-/T56S/R38E
S-/T56S/R39E
S-/T57S/R38E
S-/T57S/R39E
S-/T57S/R40E

NOTICE OF RIGHTS

As required by Sections 120.569(1), and 120.60(3), Fla. Stat., following is notice of the opportunities which may be available for administrative hearing or judicial review when the substantial interests of a party are determined by an agency. Please note that this Notice of Rights is not intended to provide legal advice. Not all the legal proceedings detailed below may be an applicable or appropriate remedy. You may wish to consult an attorney regarding your legal rights.

RIGHT TO REQUEST ADMINISTRATIVE HEARING

A person whose substantial interests are or may be affected by the South Florida Water Management District's (SFWMD or District) action has the right to request an administrative hearing on that action pursuant to Sections 120.569 and 120.57, Fla. Stat. Persons seeking a hearing on a District decision which does or may determine their substantial interests shall file a petition for hearing with the District Clerk within 21 days of receipt of written notice of the decision, unless one of the following shorter time periods apply: 1) within 14 days of the notice of consolidated intent to grant or deny concurrently reviewed applications for environmental resource permits and use of sovereign submerged lands pursuant to Section 373.427, Fla. Stat.; or 2) within 14 days of service of an Administrative Order pursuant to Subsection 373.119(1), Fla. Stat. "Receipt of written notice of agency decision" means receipt of either written notice through mail, or electronic mail, or posting that the District has or intends to take final agency action, or publication of notice that the District has or intends to take final agency action. Any person who receives written notice of a SFWMD decision and fails to file a written request for hearing within the timeframe described above waives the right to request a hearing on that decision.

Filing Instructions

The Petition must be filed with the Office of the District Clerk of the SFWMD. Filings with the District Clerk may be made by mail, hand-delivery or facsimile. **Filings by e-mail will not be accepted.** Any person wishing to receive a clerked copy with the date and time stamped must provide an additional copy. A petition for administrative hearing is deemed filed upon receipt during normal business hours by the District Clerk at SFWMD headquarters in West Palm Beach, Florida. Any document received by the office of the SFWMD Clerk after 5:00 p.m. shall be filed as of 8:00 a.m. on the next regular business day. Additional filing instructions are as follows:

- Filings by mail must be addressed to the Office of the SFWMD Clerk, P.O. Box 24680, West Palm Beach, Florida 33416.
- Filings by hand-delivery must be delivered to the Office of the SFWMD Clerk. **Delivery of a petition to the SFWMD's security desk does <u>not</u> constitute filing. To ensure proper filing, it will be necessary to request the SFWMD's security officer to contact the Clerk's office.** An employee of the SFWMD's Clerk's office will receive and file the petition.
- Filings by facsimile must be transmitted to the SFWMD Clerk's Office at (561) 682-6010. Pursuant to Subsections 28-106.104(7), (8) and (9), Fla. Admin. Code, a party who files a document by facsimile represents that the original physically signed document will be retained by that party for the duration of that proceeding and of any subsequent appeal or subsequent proceeding in that cause. Any party who elects to file any document by facsimile shall be responsible for any delay, disruption, or interruption of the electronic signals and accepts the full risk that the document may not be properly filed with the clerk as a result. The filing date for a document filed by facsimile shall be the date the SFWMD Clerk receives the complete document.

Initiation of an Administrative Hearing
Pursuant to Rules 28-106.201 and 28-106.301, Fla. Admin. Code, initiation of an administrative hearing shall be made by written petition to the SFWMD in legible form and on 8 and 1/2 by 11 inch white paper. All petitions shall contain:

1. Identification of the action being contested, including the permit number, application number, District file number or any other SFWMD identification number, if known.
2. The name, address and telephone number of the petitioner and petitioner's representative, if any.
3. An explanation of how the petitioner's substantial interests will be affected by the agency determination.
4. A statement of when and how the petitioner received notice of the SFWMD's decision.
5. A statement of all disputed issues of material fact. If there are none, the petition must so indicate.
6. A concise statement of the ultimate facts alleged, including the specific facts the petitioner contends warrant reversal or modification of the SFWMD's proposed action.
7. A statement of the specific rules or statutes the petitioner contends require reversal or modification of the SFWMD's proposed action.
8. If disputed issues of material fact exist, the statement must also include an explanation of how the alleged facts relate to the specific rules or statutes.
9. A statement of the relief sought by the petitioner, stating precisely the action the petitioner wishes the SFWMD to take with respect to the SFWMD's proposed action.

A person may file a request for an extension of time for filing a petition. The SFWMD may, for good cause, grant the request. Requests for extension of time must be filed with the SFWMD prior to the deadline for filing a petition for hearing. Such requests for extension shall contain a certificate that the moving party has consulted with all other parties concerning the extension and that the SFWMD and any other parties agree to or oppose the extension. A timely request for extension of time shall toll the running of the time period for filing a petition until the request is acted upon.

If the District takes action with substantially different impacts on water resources from the notice of intended agency decision, the persons who may be substantially affected shall have an additional point of entry pursuant to Rule 28-106.111, Fla. Admin. Code, unless otherwise provided by law.

Mediation
The procedures for pursuing mediation are set forth in Section 120.573, Fla. Stat., and Rules 28-106.111 and 28-106.401-.405, Fla. Admin. Code. The SFWMD is not proposing mediation for this agency action under Section 120.573, Fla. Stat., at this time.

RIGHT TO SEEK JUDICIAL REVIEW
Pursuant to Sections 120.60(3) and 120.68, Fla. Stat., a party who is adversely affected by final SFWMD action may seek judicial review of the SFWMD's final decision by filing a notice of appeal pursuant to Florida Rule of Appellate Procedure 9.110 in the Fourth District Court of Appeal or in the appellate district where a party resides and filing a second copy of the notice with the SFWMD Clerk within 30 days of rendering of the final SFWMD action.

APPENDIX B.1

MIAMI DADE WATER AND SEWER DEPARTMENT
MODIFICATION TO WATER USES PERMIT NO. 13-00017W
SOUTH FLORIDA WATER MANAGEMENT DISTRICT
WATER USE INDIVIDUAL PERMIT
APPLICATION NO: 140627-12

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
WATER USE INDIVIDUAL PERMIT

APPLICATION NO: 140627-12 **PERMIT NUMBER:** 13-00017-W

DATE ISSUED: February 9, 2015 **EXPIRATION DATE:** February 9, 2035

PERMITTEE: MIAMI-DADE WATER AND SEWER DEPARTMENT
P O BOX 330316
MIAMI, FL 33233-0316

PROJECT NAME: MIAMI-DADE CONSOLIDATED PWS

PROJECT LOCATION: Miami-Dade County, SEE ATTACHED FOR SECTIONS, TOWNSHIPS AND RANGES

PROJECT DESCRIPTION/AUTHORIZING:

The continued use of groundwater from the Upper Floridan aquifer and Biscayne aquifer for Public water supply for the MDWASD Service Area serving 2,642,929 persons in the year 2033 with an average finished water per capita use rate of 137.2 gallons per day per person and a maximum monthly to average monthly pumping ration of 1.05:1 with an annual allocation of 140,915.50 million gallons.

This is to notify you of South Florida Water Management District's (District) agency action concerning Permit Application Number 140627-12, received June 27, 2014. This action is taken pursuant to Chapter 373, Part II, Florida Statutes (F.S.), Rule 40E-1.603 and Chapter 40E-2, Florida Administrative Code (F.A.C). Based on the information provided, District rules have been adhered to and a Water Use Individual Permit is in effect for this project subject to:

1. Not receiving a filed request for an administrative hearing pursuant to Section 120.57 and Section 120.569 (F.S.), or request a judicial review pursuant Section 120.68, F.S.; and
2. The attached 57 permit conditions.
3. The attached 37 exhibits.

By acceptance and utilization of the water authorized under this permit, the Permittee agrees to hold and save the District and its successors harmless from any and all damages, claims or liabilities that may arise by reason of the construction, maintenance or use of activities authorized by this permit. Should you object to the permit, please refer to the attached "Notice of Rights" that addresses the procedures to be followed if you desire a public hearing or other review of the proposed agency action. Should you wish to object to the proposed agency action or file a petition or request, please provide written objections, petitions, requests and/or waivers to the District, attention of Office of the District Clerk, South Florida Water Management District, Post Office Box 24680, West Palm Beach, FL 33416-4680.

CERTIFICATION OF SERVICE

I HEREBY CERTIFY THAT this written notice has been mailed or electronically transmitted to the Permittee (and the persons listed in the attached distribution list) this 10th day of February, 2015, in accordance with Section 120.60(3), F.S. Notice was also electronically posted on this date through a link on the home page of the District's website (my.sfwmd.gov/ePermitting).

BY: _____
JUANITA BOZEMAN
DEPUTY CLERK, SOUTH FLORIDA WATER MANAGEMENT DISTRICT

SPECIAL PERMIT CONDITIONS

1. This permit is issued to:
   MIAMI-DADE WATER AND SEWER DEPARTMENT
   P O BOX 330316
   MIAMI, FL 33233-0316

2. This permit shall expire on February 9, 2035.

3. Use classification is:

   Public Water Supply
   Aquifer Storage And Recovery

4. Source classification is:

   Groundwater from:
   Biscayne Aquifer
   Upper Floridan Aquifer

5. Allocation:

   Total annual allocation is 140,915.50 million gallons (MG). (386.07 MGD)

   Total maximum monthly allocation is 12,330.11 million gallons (MG).

   Allocation from a specific source (aquifer, waterbody, facility, or facility group):

   Maximum annual allocation from Upper Floridan Aquifer shall not exceed 13,348.05 million gallons (MG). (36.60 MGD).

   Maximum annual allocation from Biscayne Aquifer shall not exceed 127,567.50 million gallons (MG). (349.50 MGD).

   Maximum monthly allocation from Upper Floridan Aquifer shall not exceed 1,167.95 million gallons (MG).

   Maximum monthly allocation from Biscayne Aquifer shall not exceed 11,162.16 million gallons (MG).

   These allocations represent the amount of water required to meet the water demands as a result of a rainfall deficit during a drought with the probability of recurring one year in ten. The Permittee shall not exceed these allocations in hydrologic conditions less than a 1-in-10 year drought event. Compliance with the annual allocation is based on the quantity withdrawn over a 12-month time period. Compliance with the maximum monthly allocation is based on the greatest quantity withdrawn in any single month. The annual allocation expressed in GPD or MGD is for

informational purposes only.

If the rainfall deficit is more severe than that expected to recur once every ten years, the withdrawals shall not exceed that amount necessary to continue to meet the reasonable-beneficial demands under such conditions, provided no harm to the water resources occur and:

1. All other conditions of the permit are met; and

2. The withdrawal is otherwise consistent with applicable declared Water Shortage Orders in effect pursuant to Chapter 40E-21, F.A.C.

6. Withdrawal facilities:

Groundwater - Proposed:

1 - 24" X 50' X 2800 GPM Well Cased To 45 Feet
7 - 24" X 1200' X 2430 GPM Wells Cased To 1100 Feet
1 - 24" X 50' X 1400 GPM Well Cased To 45 Feet
3 - 24" X 72' X 1400 GPM Wells Cased To 45 Feet
8 - 17" X 1490' X 1400 GPM Wells Cased To 1080 Feet

Groundwater - Existing:

2 - 24" X 100' X 7500 GPM Wells Cased To 50 Feet
3 - 48" X 88' X 7500 GPM Wells Cased To 33 Feet
5 - 17" X 1490' X 1400 GPM Wells Cased To 1080 Feet
1 - 4" X 74' X 0 GPM Well Cased To 63.5 Feet
1 - 18" X 65' X 1500 GPM Well Cased To 50 Feet
20 - 14" X 115' X 2500 GPM Wells Cased To 80 Feet
4 - 24" X 100' X 4900 GPM Wells Cased To 35 Feet
10 - 48" X 80' X 10420 GPM Wells Cased To 46 Feet
1 - 12" X 40' X 800 GPM Well Cased To 35 Feet
1 - 42" X 68' X 10000 GPM Well Cased To 54 Feet
1 - 6" X 30' X 400 GPM Well Cased To 25 Feet
1 - 16" X 50' X 1600 GPM Well Cased To 40 Feet
1 - 30" X 115' X 4170 GPM Well Cased To 80 Feet
1 - 18" X 66' X 1500 GPM Well Cased To 53 Feet
1 - 14" X 115' X 3800 GPM Well Cased To 80 Feet
1 - 30" X 1250' X 3500 GPM Well Cased To 845 Feet
6 - 42" X 107' X 7000 GPM Wells Cased To 66 Feet
1 - 24" X 70' X 3470 GPM Well Cased To 35 Feet
7 - 16" X 100' X 4170 GPM Wells Cased To 40 Feet
2 - 24" X 70' X 6945 GPM Wells Cased To 35 Feet
1 - 42" X 68' X 8500 GPM Well Cased To 60 Feet
1 - 17" X 1490' X 1400 GPM Well Cased To 1150 Feet

4 - 40" X 100' X 10420 GPM Wells Cased To 57 Feet
1 - 30" X 1210' X 3500 GPM Well Cased To 835 Feet
1 - 42" X 68' X 8500 GPM Well Cased To 54 Feet
1 - 18" X 55' X 1500 GPM Well Cased To 45 Feet
1 - 42" X 107' X 7000 GPM Well Cased To 69 Feet
4 - 24" X 108' X 8300 GPM Wells Cased To 50 Feet
2 - 12" X 40' X 1600 GPM Wells Cased To 35 Feet
4 - 24" X 104' X 6940 GPM Wells Cased To 54 Feet
1 - 12" X 35' X 1200 GPM Well Cased To 30 Feet
1 - 48" X 80' X 10416.67 GPM Well Cased To 46 Feet
1 - 12" X 35' X 800 GPM Well Cased To 30 Feet
1 - 30" X 115' X 2500 GPM Well Cased To 80 Feet
1 - 42" X 68' X 10000 GPM Well Cased To 60 Feet
1 - 18" X 55' X 1500 GPM Well Cased To 42 Feet
6 - 20" X 100' X 4900 GPM Wells Cased To 40 Feet
1 - 16" X 100' X 7500 GPM Well Cased To 40 Feet
1 - 18" X 50' X 500 GPM Well Cased To 40 Feet
1 - 30" X 1200' X 3500 GPM Well Cased To 765.Feet
1 - " X 60' X 0 GPM Well Cased To 55 Feet
1 - 30" X 1300' X 3500 GPM Well Cased To 850 Feet
1 - 30" X 1200' X 3500 GPM Well Cased To 760 Feet

7. The Permittee shall submit all data as required by the implementation schedule for each of the permit conditions to: SFWMD at www.sfwmd.gov/ePermitting, or Regulatory Support, MSC 9611, P.O. Box 24680, West Palm Beach, FL 33416-4680.

8. The Permittee must submit the appropriate application form incorporated by reference in Rule 40E-2.101, F.A.C., to the District prior to the permit expiration date in order to continue the use of water.

9. The Permittee shall secure a well construction permit prior to construction, repair, or abandonment of all wells, as described in Chapter 40E-3, F.A.C.

10. Permittees, who are dependent on other sources of water supply such as reclaimed water or water sale agreements to meet a portion of their demands, shall include the monthly volumes from all other sources in the report to the District, unless the use of those sources is reported to another state agency, in which case the District will obtain the water use information from said agency. The water accounting method and means of calibration shall be stated on each report.

11. Prior to any withdrawals at the project, the Permittee shall provide the results of the calibration testing of the identified water accounting method(s) and equip all existing and proposed withdrawal facilities with approved water use accounting method(s) pursuant to Subsection 4.1.1 of the Applicant's Handbook for Water Use Permit Applications.

12. Every five years from the date of last calibration, the Permittee shall submit re-calibration data for each withdrawal facility.

13. Monthly withdrawals for each withdrawal facility shall be reported to the District semi-annually. The water accounting method and means of calibration shall be stated on each report.

14. The Permittee shall notify the District within 30 days of any change in service area boundary that results in a change in demand that affects its permitted allocation. The allocation shall be modified to effectuate such change.

15. If at any time there is an indication that the well casing, valves, or controls leak or have become inoperative, repairs or replacement shall be made to restore the system to an operating condition. Failure to make such repairs shall be cause for filling and abandoning the well, in accordance with procedures outlined in Chapter 40E-3, F.A.C.

16. The Permittee shall maintain an accurate flow meter at the intake of the water treatment plant for the purpose of measuring daily inflow of water.

    Permittee shall maintain a calibrated flow meter(s) at the intake (raw water) and discharge (treated water) points within the Hialeah/Preston, Alexander Orr, and proposed Hialeah RO and South Miami Heights water treatment plants for the purpose of measuring treatment losses and shall submit monthly data semi-annually as required pursuant to Special Condition 13.

17. The Standard Water Conservation Plan described in Subsection 2.3.2.F.1.a of the Applicant's Handbook for Water Use Permit Applications within the South Florida Water Management District and the Staff Report, must be implemented in accordance with the approved implementation schedule described in the following exhibit:

    The Water Conservation Plan is contained in Exhibit 18. The permittee shall submit an annual report covering water conservation activities during the prior calendar year by April 15 of each year describing water conservation activities for the year including expenditures, projects undertaken and estimated water savings.

18. The Permittee shall notify the District within 30 days of entering into an inter-local agreement, contract, or other similar instrument to deliver or receive water outside of its service area or to serve a demand not identified to determine the allocation described in this permit. A copy of such agreement shall be provided to the District. The monthly volume of water delivered and/or received via each inter-local agreement, contract, or other similar instrument shall be submitted to the District at the same reporting frequency as the withdrawals for each withdrawal facility required in this permit.

19. The Permittee shall implement the wellfield operating plan submitted in support of the permit application, as described in the District staff report.

See Exhibit 10

20. The Permittee shall determine unaccounted-for distribution system losses. Losses shall be determined for the entire distribution system on a monthly basis. Permittee shall define the manner in which unaccounted-for losses are calculated. Reports shall be submitted to the District on a yearly basis and are due by April 30th of each year.

    In the event that the annual unaccounted-for distribution system losses, as defined by Section 2.3.2.F.2.c, of the Applicants Handbook for Water Use Permit Applications [AH], exceeds 10 percent, the permittee shall include in the annual report a description of additional actions which will be implemented the following year(s) to reduce the losses to less than ten percent.

21. Public water utilities that control, either directly or indirectly, a wastewater treatment plant, and which have determined pursuant to Section 403.064, F.S., that use of reclaimed water is feasible, must provide the District with annual updates of the following information: 1) the status of distribution system construction, including location and capacity of lines; 2) a summary of uncommitted supplies for the next year; 3) copies of any new or amended local mandatory reclaimed water reuse zone ordinances; and 4) a list of end-users who have contracted to receive reclaimed water and the agreed upon quantity of water to be delivered.

22. The Permittee shall maintain an accurate flow meter at the point of discharge from the treatment plant for the purpose of measuring the daily flow of water.

    Permittee shall maintain a calibrated flow meter(s) at the intake (raw water) and discharge (treated water) points within the Hialeah/Preston, Alexander Orr, and proposed Hialeah RO and South Miami Heights water treatment plants for the purpose of measuring treatment losses and shall submit monthly data semi-annually as required pursuant to Special Condition 13.

23. Pursuant to Section 373.236(4), F.S., every ten years from the date of permit issuance, the Permittee shall submit a water use compliance report for review and approval by District Staff to SFWMD at www.sfwmd.gov/ePermitting, or Regulatory Support, MSC 9611, P.O. Box 24680, West Palm Beach, FL 33416-4680.
    (A) The results of a water conservation audit that documents the efficiency of water use on the project site using data produced from an onsite evaluation conducted. In the event that the audit indicates additional water conservation is appropriate or the per capita use rate authorized in the permit is exceeded, the permittee shall propose and implement specific actions to reduce the water use to acceptable levels within timeframes proposed by the permittee and approved by the District.

    (B) A comparison of the permitted allocation and the allocation that would apply to the project based on current District allocation rules and updated population and per capita use rates. In the event the permit allocation is greater than the allocation provided for under District rule, the permittee shall apply for a letter modification to reduce the allocation consistent with District rules and the updated population and per capita use rates to the extent they are considered by the

District to be indicative of long term trends in the population and per capita use rates over the permit duration. In the event that the permit allocation is less than allowable under District rule, the permittee shall apply for a modification of the permit to increase the allocation if the permittee intends to utilize an additional allocation, or modify its operation to comply with the existing conditions of the permit.

3. Summary of the current and previous nine years progress reports for implementation of the Alternative Water Supply Plan and any modifications necessary to continue to meet the Plan requirements and conditions for issuance.

4. Information demonstrating that the conditions for issuance of the permit are being complied with, pursuant to Special Condition 45 and Section 373.236, F.S.

5. Updates or amendments to the County's reuse plan.

24. The Permittee shall provide annual status reports to the District that summarizes the Aquifer Storage and Recovery cycle testing activities. Reports shall be submitted to the District on a yearly basis and are due by April 30th of each year.

25. The Permittee shall submit to the District an updated "Summary of Groundwater (Well) Facilities" table ("Section IV - Sources of Water", Water Use Permit Application Form 1379) within 90 days of completion of the proposed wells identifying the actual total and cased depths, pump manufacturer and model numbers, pump types, intake depths and type of meters.

26. The permittee shall operate surface water control structure known as the Mid-canal structure and bridge in accordance with the approved operational plan included in Exhibit 22. In addition, whenever this structure is opened for the purpose of raising water in the Wellfield Protection Canal down stream of the structure, the upstream structure that delivers water from the L-30 canal shall be opened in a manner to deliver equal volumes to those passed through the Mid-canal structure and bridge. The permittee shall submit operation and flow data logs regarding both structures to the District semi-annually.

27. The Permittee is authorized to exercise the emergency wells at the Medley Wellfield for a total of two hours per month as needed for bacterial clearance and pump maintenance. Operation of the emergency wells at the Medley Wellfield for more than this amount shall require prior approval from SFWMD. Pumpage data shall be collected and report in accordance with Special Condition 13.

28. No more than 15 MGD shall be withdrawn from the West Biscayne aquifer Wellfield on any given day.

29. No more than 25,550 MGY shall be withdrawn during any 12 month consecutive period from the combined Hialeah, Preston, Medley and Miami Springs Biscayne aquifer wellfields.

30. No more than 7,993 MGY shall be withdrawn during any 12 month consecutive period from the Snapper Creek Wellfield.

31. No more than 39,931 MGY shall be withdrawn during any 12 month consecutive period from the Southwest Biscayne aquifer Wellfield.

32. No more than 67,999 MGY shall be withdrawn during any 12 month consecutive period from the combined West, Southwest Snapper Creek and Alexander Orr Biscayne aquifer wellfields.

33. No more than 1,095 MGY shall be withdrawn during any 12 month consecutive period from the South Miami Heights Wellfield.

34. No more than 1,752 MGY shall be withdrawn during any 12 month consecutive period from the combined Everglades Labor Camp and Newton wellfields.

35. No more than 1,571 MGY shall be withdrawn during any 12 month consecutive period from the combined Elevated Tank, Leisure City and Naranja wellfields.

36. The Permittee shall continue to submit monitoring data in accordance with the approved water level monitoring program for this project. The existing monitoring program is described in Exhibits 30 and 32B.

37. The Permittee shall continue to submit monitoring data in accordance with the approved saline water intrusion monitoring program for this project.
See exhibits 28A and 32B for a list of monitor wells and required sampling schedule.

    The permittee shall submit annual Monitoring Program summary reports. The annual report will summarize the status of the project to update the salt front and install new monitor wells.

38. Within six months of permit issuance, an executed large user water agreement with the City of Hialeah shall be submitted to the District. In the event that the final agreement is for volumes less than those used in the formulation of the allocations in this permit, the allocations shall be reduced through a letter modification.

39. The permittee shall update the District on the status of reuse projects in Exhibit 14 on an annual basis.

40. The permittee will develop alternative water supplies in accordance with the schedules described in Exhibit 13.

    The permittee will provide annual updates of the status of all alternative water supply projects (per

the timeframes contained in Special Condition 44). The status report shall include work completed to date, expenditures and any anticipated changes in the timelines.

41. In the event that a milestone specified in the alternative water supply schedule and plan contained in Exhibit 13 is going to be missed, the permittee shall notify the Executive Director of the District in writing explaining the nature of the delay, actions taken to bring the project back on schedule and an assessment of the impact the delay would have on the rates of withdrawals from the Everglades water bodies and associated canals as defined in SFWMD consumptive use permitting rules. The District will evaluate the situation and take actions as appropriate which could include: a.) granting an extension of time to complete the project (if the delay is minor and doesn't affect the Everglades Waterbodies or otherwise violates permit conditions), b.) take enforcement actions including consent orders and penalties, c.) modify allocations contained in this permit from the Biscayne aquifer including capping withdrawal rates until the alternative water supply project(s) are completed (in cases where the delay would result in violations of permit conditions) or d.) working with the Department of Community Affairs to limit increase demands for water until the alternative water supply project is completed.

42. For rehydration of Biscayne Coastal Wetlands, in consultation with the District, the FDEP and Biscayne Bay National Park, upon completion of the pilot testing program, the parties shall agree on the water quality treatment required and the feasibility, as defined in Section 2.2.4 of the Applicants Handbook for Water Use Permit Applications, of this project on or before April 15, 2015. Extension of this deadline may be issued in writing by the District upon demonstration of good cause such as events beyond the control of the permittee or after consideration of the results/data collected, the District determines that additional testing is necessary. In determining the water quality needed, the parties will consider State and Federal water quality discharge standards, the volume and timing of water to be delivered to Biscayne Bay and the location of delivery. In the event the parties do not reach agreement on the feasibility by April 15, 2015, the Permittee shall begin development of an alternate reuse project from the South District wastewater facility and shall provide the District with a proposal for an alternate project including a conceptual design and schedule for implementation on or before March 15, 2016.

43. The permittee may request temporary authorization from the District to capture and store stormwater via withdrawals from the permitted Biscayne aquifer production wells, for storage within the Floridan aquifer system consistent with their FDEP issued Underground Injection Control permits.The District will consider the availability of stormwater that is not otherwise needed for environmental protection or enhancement and is in no way bound to authorize such requests. All such requests shall be made in writing to the Director of Water Use Regulation.

44. All annual reports required in these Special Conditions shall address activities that occurred during a calendar year and shall be submitted to Water Use Compliance on or before April 15th of the following year.

45. If it is determined that the conditions for permit issuance are no longer met for the 20 year permit duration, the permittee shall obtain a modification of the Permit from the District as necessary to

come into compliance with the conditions for permit issuance. Such conditions for permit issuance include minimum flows and levels, water reservations, and other conditions ensuring the use does not cause water resource harm and is consistent with the objectives of the District, including implementation of the Comprehensive Everglades Restoration Plan.

46. The permittee shall operate the West Wellfield in accordance with the Memorandum of Understanding between the U.S. Department of the Interior, the Governor of the State of Florida, Miami Dade County and the District incorporated in Exhibit 35.

STANDARD PERMIT CONDITIONS

1. All water uses authorized by this permit shall be implemented as conditioned by this permit, including any documents incorporated by reference in a permit condition. The District may revoke this permit, in whole or in part, or take enforcement action, pursuant to Section 373.136 or 373.243, F.S., unless a permit modification has been obtained to address the noncompliance.

   The Permittee shall immediately notify the District in writing of any previously submitted material information that is later discovered to be inaccurate.

2. The Permittee is advised that this permit does not relieve any person from the requirement to obtain all necessary federal, state, local and special district authorizations.

3. The Permittee shall notify the District in writing within 30 days of any sale, transfer, or conveyance of ownership or any other loss of permitted legal control of the Project and/or related facilities from which the permitted consumptive use is made. Where Permittee's control of the land subject to the permit was demonstrated through a lease, the Permittee must either submit a new or modified lease showing that it continues to have legal control or documentation showing a transfer in control of the permitted system/project to the new landowner or new lessee. All transfers of ownership are subject to the requirements of Rule 40E-1.6107, F.A.C. Alternatively, the Permittee may surrender the consumptive use permit to the District, thereby relinquishing the right to conduct any activities under the permit.

4. Nothing in this permit should be construed to limit the authority of the District to declare a water shortage and issue orders pursuant to Chapter 373, F.S. In the event of a declared water shortage, the Permittee must adhere to the water shortage restrictions, as specified by the District. The Permittee is advised that during a water shortage, reports shall be submitted as required by District rule or order. The Permittee is advised that during a water shortage, pumpage, water levels, and water quality data shall be collected and submitted as required by District orders issued pursuant to Chapter 40E-21, F.A.C.

5. This permit does not convey to the Permittee any property rights or privileges other than those specified herein, nor relieve the permittee from complying with any applicable local government, state, or federal law, rule, or ordinance.

6. With advance notice to the Permittee, District staff with proper identification shall have permission to enter, inspect, observe, collect samples, and take measurements of permitted facilities to determine compliance with the permit conditions and permitted plans and specifications. The Permittee shall either accompany District staff onto the property or make provision for access onto the property.

7. A. The Permittee may seek modification of any term of an unexpired permit. The Permittee is advised that Section 373.239, F.S., and Rule 40E-2.331, F.A.C., are applicable to permit modifications.

   B. The Permittee shall notify the District in writing 30 days prior to any changes to the project that

could potentially alter the reasonable demand reflected in the permitted allocation. Such changes include, but are not limited to, change in irrigated acreage, crop type, irrigation system, large users agreements, or water treatment method. Permittee will be required to apply for a modification of the permit for any changes in permitted allocation.

8. If any condition of the permit is violated, the permit shall be subject to review and modification, enforcement action, or revocation pursuant to Chapter 373, F.S.

9. The Permittee shall mitigate interference with existing legal uses that was caused in whole or in part by the Permittee's withdrawals, consistent with the approved mitigation plan. As necessary to offset the interference, mitigation will include pumpage reduction, replacement of the impacted individual's equipment, relocation of wells, change in withdrawal source, or other means.

   Interference to an existing legal use is defined as an impact that occurs under hydrologic conditions equal to or less severe than a 1-in-10 year drought event that results in the:

   A. Inability to withdraw water consistent with provisions of the permit, such as when remedial structural or operational actions not materially authorized by existing permits must be taken to address the interference; or

   B. Change in the quality of water pursuant to primary State Drinking Water Standards to the extent that the water can no longer be used for its authorized purpose, or such change is imminent.

10. The Permittee shall mitigate harm to the natural resources caused by the Permittee's withdrawals, as determined through reference to the conditions for permit issuance. When harm occurs, or is imminent, the District will require the Permittee to modify withdrawal rates or mitigate the harm. Harm, as determined through reference to the conditions for permit issuance includes:

    A. Reduction in ground or surface water levels that results in harmful lateral movement of the fresh water/salt water interface,

    B. Reduction in water levels that harm the hydroperiod of wetlands,

    C. Significant reduction in water levels or hydroperiod in a naturally occurring water body such as a lake or pond,

    D. Harmful movement of contaminants in violation of state water quality standards, or

    E. Harm to the natural system including damage to habitat for rare or endangered species.

11. The Permittee shall mitigate harm to existing off-site land uses caused by the Permittee's withdrawals, as determined through reference to the conditions for permit issuance. When harm occurs, or is imminent, the District will require the Permittee to modify withdrawal rates or mitigate the harm. Harm as determined through reference to the conditions for permit issuance, includes:

A. Significant reduction in water levels on the property to the extent that the designed function of the water body and related surface water management improvements are damaged, not including aesthetic values. The designed function of a water body is identified in the original permit or other governmental authorization issued for the construction of the water body. In cases where a permit was not required, the designed function shall be determined based on the purpose for the original construction of the water body (e.g. fill for construction, mining, drainage canal, etc.)

B. Damage to agriculture, including damage resulting from reduction in soil moisture resulting from consumptive use; or,

C. Land collapse or subsidence caused by reduction in water levels associated with consumptive use.

Application Number: 140627-12

Permit Number: 13-00017-W

Project Name: MIAMI-DADE CONSOLIDATED PWS

Location: MIAMI-DADE COUNTY, S-/T53S/R39E
S-/T53S/R40E
S-/T53S/R41E
S-/T54S/R39E
S-/T54S/R40E
S-/T54S/R41E
S-/T54S/R42E
S-/T55S/R39E
S-/T55S/R40E
S-/T56S/R38E
S-/T56S/R39E
S-/T57S/R38E
S-/T57S/R39E
S-/T57S/R40E

NOTICE OF RIGHTS

As required by Sections 120.569(1), and 120.60(3), Fla. Stat., the following is notice of the opportunities which may be available for administrative hearing or judicial review when the substantial interests of a party are determined by an agency. Please note that this Notice of Rights is not intended to provide legal advice. Not all the legal proceedings detailed below may be an applicable or appropriate remedy. You may wish to consult an attorney regarding your legal rights.

RIGHT TO REQUEST ADMINISTRATIVE HEARING

A person whose substantial interests are or may be affected by the South Florida Water Management District's (SFWMD or District) action has the right to request an administrative hearing on that action pursuant to Sections 120.569 and 120.57, Fla. Stat. Persons seeking a hearing on a SFWMD decision which does or may affect their substantial interests shall file a petition for hearing with the District Clerk within 21 days of receipt of written notice of the decision, unless one of the following shorter time periods apply: 1) within 14 days of the notice of consolidated intent to grant or deny concurrently reviewed applications for environmental resource permits and use of sovereign submerged lands pursuant to Section 373.427, Fla. Stat.; or 2) within 14 days of service of an Administrative Order pursuant to Subsection 373.119(1), Fla. Stat. "Receipt of written notice of agency decision" means receipt of either written notice through mail, electronic mail, or posting that the SFWMD has or intends to take final agency action, or publication of notice that the SFWMD has or intends to take final agency action. Any person who receives written notice of a SFWMD decision and fails to file a written request for hearing within the timeframe described above waives the right to request a hearing on that decision.

FILING INSTRUCTIONS

The Petition must be filed with the Office of the District Clerk of the SFWMD. Filings with the District Clerk may be made by mail, hand-delivery, or e-mail. **Filings by facsimile will not be accepted after October 1, 2014.** A petition for administrative hearing or other document is deemed filed upon receipt during normal business hours by the District Clerk at SFWMD headquarters in West Palm Beach, Florida. Any document received by the office of the District Clerk after 5:00 p.m. shall be filed as of 8:00 a.m. on the next regular business day. Additional filing instructions are as follows:

- Filings by mail must be addressed to the Office of the District Clerk, P.O. Box 24680, West Palm Beach, Florida 33416.
- Filings by hand-delivery must be delivered to the Office of the District Clerk. **Delivery of a petition to the SFWMD's security desk does not constitute filing. To ensure proper filing, it will be necessary to request the SFWMD's security officer to contact the Clerk's office.** An employee of the SFWMD's Clerk's office will receive and file the petition.
- Filings by e-mail must be transmitted to the District Clerk's Office at clerk@sfwmd.gov. The filing date for a document transmitted by electronic mail shall be the date the District Clerk receives the complete document. A party who files a document by e-mail shall (1) represent that the original physically signed document will be retained by that party for the duration of the proceeding and of any subsequent appeal or subsequent proceeding in that cause and that the party shall produce it upon the request of other parties; and (2) be responsible for any delay, disruption, or interruption of the electronic signals and accepts the full risk that the document may not be properly filed.

INITIATION OF AN ADMINISTRATIVE HEARING

Pursuant to Rules 28-106.201 and 28-106.301, Fla. Admin. Code, initiation of an administrative hearing shall be made by written petition to the SFWMD in legible form and on 8 and 1/2 by 11 inch white paper. All petitions shall contain:

1. Identification of the action being contested, including the permit number, application number, SFWMD file number or any other SFWMD identification number, if known.
2. The name, address and telephone number of the petitioner and petitioner's representative, if any.
3. An explanation of how the petitioner's substantial interests will be affected by the agency decision.
4. A statement of when and how the petitioner received notice of the SFWMD's decision.
5. A statement of all disputed issues of material fact. If there are none, the petition must so indicate.
6. A concise statement of the ultimate facts alleged, including the specific facts the petitioner contends warrant reversal or modification of the SFWMD's proposed action.
7. A statement of the specific rules or statutes the petitioner contends require reversal or modification of the SFWMD's proposed action.
8. If disputed issues of material fact exist, the statement must also include an explanation of how the alleged facts relate to the specific rules or statutes.
9. A statement of the relief sought by the petitioner, stating precisely the action the petitioner wishes the SFWMD to take with respect to the SFWMD's proposed action.

A person may file a request for an extension of time for filing a petition. The SFWMD may, for good cause, grant the request. Requests for extension of time must be filed with the SFWMD prior to the deadline for filing a petition for hearing. Such requests for extension shall contain a certificate that the moving party has consulted with all other parties concerning the extension and that the SFWMD and any other parties agree to or oppose the extension. A timely request for extension of time shall toll the running of the time period for filing a petition until the request is acted upon.

If the SFWMD takes action with substantially different impacts on water resources from the notice of intended agency decision, the persons who may be substantially affected shall have an additional point of entry pursuant to Rule 28-106.111, Fla. Admin. Code, unless otherwise provided by law.

MEDIATION

The procedures for pursuing mediation are set forth in Section 120.573, Fla. Stat., and Rules 28-106.111 and 28-106.401-.405, Fla. Admin. Code. The SFWMD is not proposing mediation for this agency action under Section 120.573, Fla. Stat., at this time.

RIGHT TO SEEK JUDICIAL REVIEW

Pursuant to Sections 120.60(3) and 120.68, Fla. Stat., a party who is adversely affected by final SFWMD action may seek judicial review of the SFWMD's final decision by filing a notice of appeal pursuant to Florida Rule of Appellate Procedure 9.110 in the Fourth District Court of Appeal or in the appellate district where a party resides and filing a second copy of the notice with the District Clerk within 30 days of rendering of the final SFWMD action.

Last Date for Agency Action:
February 12, 2015

WATER USE STAFF REPORT

FINAL APPROVED BY EXECUTIVE DIRECTOR FEBRUARY 9, 2015

Application Number: 140627-12

Permit Number: 13-00017-W

Project Name: MIAMI-DADE CONSOLIDATED PWS

Water Use Permit Status: MODIFICATION/RENEWAL

Location: MIAMI-DADE COUNTY, S-/T53S/R39E
S-/T53S/R40E
S-/T53S/R41E
S-/T54S/R39E
S-/T54S/R40E
S-/T54S/R41E
S-/T54S/R42E
S-/T55S/R39E
S-/T55S/R40E
S-/T56S/R38E
S-/T56S/R39E
S-/T57S/R38E
S-/T57S/R39E
S-/T57S/R40E

Applicant's Name and Address: MIAMI-DADE WATER AND SEWER DEPARTMENT
P O BOX 330316
MIAMI, FL 33233-0316

Water Use Classification: Public Water Supply
Aquifer Storage And Recovery

Sources:

Groundwater from: Biscayne Aquifer
Upper Floridan Aquifer

Authorized Allocation:

Annual Allocation:	140,915.5	Million Gallons (MG)
Maximum Monthly Allocation:	12,330.1	Million Gallons (MG)

Specific Source Limitations:	**Annual(MG)**	**Monthly(MG)**
Biscayne Aquifer	127,567.5	11,162.16
Upper Floridan Aquifer	13,348.05	1,167.95

Existing Withdrawal Facilities - Groundwater

Existing Withdrawal Facilities - Groundwater

Source: Biscayne Aquifer
1 - 18" X 66' X 1500 GPM Well Cased to 53 Feet
1 - 30" X 115' X 2500 GPM Well Cased to 80 Feet
2 - 24" X 70' X 6945 GPM Wells Cased to 35 Feet
1 - 42" X 68' X 8500 GPM Well Cased to 54 Feet
1 - 30" X 115' X 4170 GPM Well Cased to 80 Feet
1 - 14" X 115' X 3800 GPM Well Cased to 80 Feet
1 - 16" X 50' X 1600 GPM Well Cased to 40 Feet
1 - 6" X 30' X 400 GPM Well Cased to 25 Feet
7 - 16" X 100' X 4170 GPM Wells Cased to 40 Feet
1 - 42" X 68' X 8500 GPM Well Cased to 60 Feet
1 - 24" X 70' X 3470 GPM Well Cased to 35 Feet
1 - 16" X 100' X 7500 GPM Well Cased to 40 Feet
6 - 42" X 107' X 7000 GPM Wells Cased to 66 Feet
1 - 18" X 55' X 1500 GPM Well Cased to 42 Feet
1 - 12" X 40' X 800 GPM Well Cased to 35 Feet
4 - 24" X 108' X 8300 GPM Wells Cased to 50 Feet
3 - 48" X 88' X 7500 GPM Wells Cased to 33 Feet
1 - 18" X 50' X 500 GPM Well Cased to 40 Feet
4 - 24" X 104' X 6940 GPM Wells Cased to 54 Feet
1 - 18" X 65' X 1500 GPM Well Cased to 50 Feet
1 - 12" X 35' X 1200 GPM Well Cased to 30 Feet
6 - 20" X 100' X 4900 GPM Wells Cased to 40 Feet
2 - 24" X 100' X 7500 GPM Wells Cased to 50 Feet
4 - 24" X 100' X 4900 GPM Wells Cased to 35 Feet
1 - 48" X 80' X 10416.67 GPM Well Cased to 46 Feet
10 - 48" X 80' X 10420 GPM Wells Cased to 46 Feet
1 - 42" X 68' X 10000 GPM Well Cased to 54 Feet
1 - 18" X 55' X 1500 GPM Well Cased to 45 Feet
1 - 42" X 107' X 7000 GPM Well Cased to 69 Feet
2 - 12" X 40' X 1600 GPM Wells Cased to 35 Feet
20 - 14" X 115' X 2500 GPM Wells Cased to 80 Feet
4 - 40" X 100' X 10420 GPM Wells Cased to 57 Feet
1 - 12" X 35' X 800 GPM Well Cased to 30 Feet
1 - 42" X 68' X 10000 GPM Well Cased to 60 Feet
Source: Upper Floridan Aquifer
5 - 17" X 1490' X 1400 GPM Wells Cased to 1080 Feet
1 - 30" X 1200' X 3500 GPM Well Cased to 765 Feet
1 - 30" X 1210' X 3500 GPM Well Cased to 835 Feet
1 - 30" X 1300' X 3500 GPM Well Cased to 850 Feet
1 - 30" X 1250' X 3500 GPM Well Cased to 845 Feet
1 - 30" X 1200' X 3500 GPM Well Cased to 760 Feet
1 - 17" X 1490' X 1400 GPM Well Cased to 1150 Feet

Proposed Withdrawal Facilities - Groundwater

Proposed Withdrawal Facilities - Groundwater

Source: Biscayne Aquifer
1 - 24" X 50' X 1400 GPM Well Cased to 45 Feet
1 - 24" X 50' X 2800 GPM Well Cased to 45 Feet
3 - 24" X 72' X 1400 GPM Wells Cased to 45 Feet
Source: Upper Floridan Aquifer
7 - 24" X 1200' X 2430 GPM Wells Cased to 1100 Feet
8 - 17" X 1490' X 1400 GPM Wells Cased to 1080 Feet

Rated Capacity Source	Status Code	GPM	MGM	MGY
Biscayne Aquifer	E	518,777	22,710.0	272,669
Upper Floridan Aquifer	E	25,900	1,133.8	13,613
Biscayne Aquifer	P	8,400	367.7	4,415
Upper Floridan Aquifer	P	28,210	1,234.9	14,827
Totals:		**581,287**	**25,446.4**	**305,524**

PURPOSE

The purpose of this application is to renew and modify Water Use Permit 13-00017-W for public water supply for the Miami-Dade Water and Sewer Department (MDWASD) service area serving 2,642,929 persons in the year 2033 with an average finished water per capita use rate of 137.2 gallons per capita per day (gpcd) and a maximum monthly to average monthly pumping ratio of 1.05:1. Withdrawals are from the Biscayne aquifer via 84 existing and 5 proposed withdrawal facilities and from the Upper Floridan aquifer system (FAS) via 6 existing withdrawal facilities and 15 proposed withdrawal facilities. In addition, there are five Aquifer Storage and Recovery (ASR) facilities.

The following modifications to the existing WUP are recommended:

Source Allocation Changes:
Decrease the Biscayne aquifer allocation by 16.36 million gallons per day (MGD), from 133,539 million gallons per year (MGY), or 365.86 MGD to 127,567.5 MGY (349.5 MGD). Because of conservation efforts and updated population projections, MDWASD no longer requires additional water from the Biscayne aquifer beyond the base condition amount. As a result, the West District Water Reclamation Plant (WRP) Canal Recharge projects (Projects 6 and 7 shown on Exhibit 14 from the previous permit issued in 2012) are no longer required to offset proposed Biscayne aquifer withdrawals beyond the established base condition of 349.5 MGD. A chart showing reduction in gpcd is shown on Exhibit 6.

Decrease the Floridan aquifer allocation by 10.03 MGD, from 17,009 MGY (46.6 MGD) to 13,348 MGY (36.57 MGD) through the reduction in proposed pumpage from the Hialeah FAS from 23.33 MGD to 13.30 MGD, due to decreased projected demands..

Reuse Projects:
Revise the reuse requirement (Limiting Condition 39 of the 2012 permit) reducing the

PURPOSE (CONTINUED)
minimum volume of reuse projects (as set forth in Projects 1 through 8 of Exhibit 14 of the 2012 permit) from 170 MGD to 117.5 MGD. This volume meets the minimum requirement of the ocean outfall legislation (See Exhibit 14).

Remove from the permit a requirement to provide 37 MGD of advanced treated reclaimed water to recharge the Alexander Orr water treatment plant (WTP) Wellfields (Projects 5 and 6 from Exhibit 14 of the 2012 permit).

Remove from the permit a requirement to provide seven MGD of reclaimed water from the North District wastewater treatment plant (WWTP) (Project 7 from Exhibit 14 of the 2012 permit).

PROJECT DESCRIPTION
The Miami-Dade Consolidated Public Water Supply (Project) is a currently permitted (13-00017-W) project located in eastern Miami-Dade County (Exhibit 1). MDWASD's service area is depicted on Exhibit 2A. MDWASD is permitted to provide potable water from 15 wellfields (Exhibit 3A) to a projected population of 2,642,929 persons in the year 2033. Withdrawals are from the Biscayne aquifer via 95 existing and 5 proposed withdrawal facilities and from the FAS via 6 existing withdrawal facilities and 15 proposed withdrawal facilities. In addition, there are five existing ASR facilities. Individual wellfield layouts are shown on Exhibits 3B to 3R). Prior to drilling the proposed wells, it will be necessary to obtain well construction permits from the Florida Department of Health in Miami-Dade County.

System Description:
The overall Project is divided into North, Central and South systems with some interconnection between them at the treated water distribution level (Exhibits 2B and 3A).

The North system includes the Hialeah and John E. Preston WTPs, which are supplied by the Hialeah, Preston, Miami Springs (upper and lower) and Northwest wellfields and by the Medley wellfield on an emergency basis. A reverse osmosis (RO) treatment plant, producing approximately 7.5 MGD of treated FAS water from 6 Floridan aquifer wells, began operation in December of 2013 (Phase 1) in the City of Hialeah. The Hialeah FAS system will ultimately produce 10 MGD of treated water upon completion in 2015 (Exhibit 13). See Exhibits 3B through 3G for well locations for the North System.

The Central system includes the Alexander Orr, Jr. WTP, which is supplied by the Alexander Orr, Snapper Creek, Southwest and West Wellfields. There are three existing ASR Floridan aquifer wells at the West Wellfield (WWF) and two at the Southwest wellfield (SWWF). See Exhibits 3H through 3K for well locations for the Central System.

In the previous permit, a total of 37 MGD (above the calculated base condition of 85.9 MGD) was authorized from the SWWF beginning in 2021. These additional withdrawals were to be offset on a 1:1 basis by applying reclaimed water between the SWWF and regional waterbodies. Due to water conservation measures and updated population

PROJECT DESCRIPTION (CONTINUED)

projections showing a lower population growth rate through 2033, MDWASD no longer requires this additional water, beyond the modified base condition of 349.5 MGD, from the Biscayne aquifer. Therefore, the allocation from the Biscayne aquifer is reduced by this quantity and the reuse project is no longer required.

For the previous permit modification, modeling was conducted to show that the base condition allocation for the SWWF could be increased from 85.9 MGD to 110 MGD (an additional 24.1 MGD) by reducing the base condition allocation for the Alexander Orr Wellfield from 62 MGD to 40 MGD without inducing additional seepage from the regional waterbodies. This shift in allocation from Alexander Orr to the SWWF allows the ASR wells to be used on a regular basis storing Biscayne aquifer volumes not exceeding the Biscayne aquifer wellfield limits for the water use permit. Exhibit 10C shows components used to derive the modified Biscayne aquifer base condition for the various wellfields.

The South system currently consists of five wellfields and associated equipment: 1) Everglades Labor Camp, 2) Leisure City, 3) Newton, 4) Elevated Tank, and 5) Naranja. A new South Miami Dade membrane-softening WTP is scheduled to be completed by December 31, 2019. Two new Biscayne aquifer wellfields in South Miami Heights (SMH), at the Former Plant site and Roberta Hunter Park, will provide three MGD of raw water to the new membrane plant. A new 23.3 MGD FAS wellfield and RO treatment plant capable of providing 17.5 MGD of treated water will also be constructed in the SMH area. Phase 1 of the SMH RO treatment plant is scheduled to be completeed at the end of 2019 and will be capabpe of providing 12.45 MGD of treated water. Phase 2 of this treatment plant is scheduled to be completed by the end of 2031 and will provide an additional five MGD of treated water (see Exhibit 13). See Exhibits 3L through 3R for well locations. Leisure City, Elevated Tank, and Naranja WTPs and wellfields will be taken off-line upon operational status of the new South Miami-Dade membrane WTP and the Everglades and Newton facilities will go to standby status.

Permit History:

North Miami-Dade:
The South Florida Water Management District (SFWMD or District) issued the first water use permit for the Hialeah-Preston WTPs (Water Use Permit 13-00018) on February 7, 1975, with an annual allocation of 38.74 billion gallons per year (BGY) (106.14 MGD) from the Miami Springs, Medley, Hialeah and Preston Wellfields. This permit (Water Use Permit 13-00018-W) was reissued on February 12, 1981 for a ten-year period and an annual allocation of 45.62 BGY (124.97 MGD).

The first water use permit for the Northwest Wellfield (Water Use Permit 13-00037-W) was issued on September 4, 1975 for an annual allocation of 18.15 BGY (50 MGD). The Northwest Wellfield water Use Permit 13-00037-W with an annual allocation of 60.23 BGY (165 MGD) was modified and issued on March 12, 1987.

PROJECT DESCRIPTION (CONTINUED)

The Hialeah-Preston and Northwest permits were combined into one master permit (Water Use Permit 13-00037-W) on March 14, 1991. The permit authorized a withdrawal of 60.20 BGY, an average daily withdrawal of 164.93 MGD, and a maximum daily withdrawal of 197.91 MGD. In February 1999, the permit was reissued for an annual allocation of 72,703 million gallons (MG) (72.7 BGY) and a maximum day allocation of 235.04 MGD. The permit included a maximum pumpage from the Northwest Wellfield of 155 MGD, and 70 MGD from the Hialeah, Preston, and Miami Springs Wellfields, and the remainder (but not limited to) 10 MGD from the ASR wells. The permitted wellfields included 45 Biscayne aquifer production wells located in the Hialeah, Preston, Miami Springs and Northwest Wellfields. An application to modify the permit was received on January 8, 2001. The permit expiration date was February 11, 2004.

Central Miami-Dade:

The SFWMD issued the first water use permit for Alexander Orr, Southwest and Snapper Creek wellfields (Water Use Permit 13-00017-W) on February 7, 1975, with an annual allocation of 30.66 BGY (84 MGD). On September 4, 1975, the annual allocation was increased to 34.31 BGY (94 MGD). The permit was renewed on December 13, 1979, with an annual allocation of 47.45 BGY (130 MGD) and included the allocations and service areas previously associated with Water Use Permits 13-00028-W, (Florida Water & Utilities), 13-00058-W (General Water Works), and 13-00067-W (South Miami Heights). On April 10, 1986, the permit was renewed with an annual allocation of 60.408 BGY (165.5 MGD), and a maximum day allocation of 198.2 MG. The permit was renewed again on November 10, 1993, with an annual allocation of 66.231 BGY (181.45 MGD) from the Alexander Orr, Southwest, Snapper Creek and WWF. In May 1995, the SFWMD issued Water Use Permit 13-00017-W for the Alexander-Orr WTP with an annual allocation of 74,136 MG (203.11 MGD), and a maximum day allocation of 241.60 MGD, of which 23.96 MGD are allocated to ASR. The permit expiration date was May 11, 2004, and an application to renew and modify the permit was received on the expiration date.

South Miami-Dade:

Water Use Permit 13-00040-W was initially issued to Rex Utilities, Inc. on March 18, 1976, with an annual allocation of 4.15 BGY (11.4 MGD) and a maximum day of 14.8 MGD. Subsequently, MDWASD acquired the facilities that are now known as the South Miami-Dade Water Supply System. The original permit was modified and renewed on July 8, 1982, with an allocation of 3.76 BGY (10.61 MGD) and a maximum day of 15.9 MGD for the six wellfields. The permit expired on July 8, 1992 and was reissued to MDWASD on July 14, 1994, with an annual allocation of 3.873 BGY (10.61 MGD) and a maximum day of 15.92 MGD. On July 11, 1998, the permit was renewed again with an annual allocation of 3.902 BGY (10.69 MGD) and a maximum day of 13.58 MGD. On March 13, 2003, the SFWMD re-issued permit number 1300040-W with an annual allocation of 3.997 BG (10.95 MGD), and a maximum daily allocation of 13.4 MGD and authorization to install 4 new wellfields to supply water to a new membrane softening WTP. The permit expiration date was March 13, 2008.

PROJECT DESCRIPTION (CONTINUED)

Consent Agreement:
On May 10, 2006, Miami-Dade County and the SFWMD entered into an Interim Consumptive Use Authorization and Agreement. The agreement authorized withdrawals of up to 349.76 MGD for a duration of 18 months, required completion of a list of tasks to respond to an outstanding Request for Additional Information necessary to issue a 20 year permit, granted 18 months to complete the tasks, and required Miami-Dade County to develop a plan to use alternative sources to meet all future demands over 347 MGD.

Consolidated Permit:
On November 15, 2007, Water Use Permit 13-00017-W was renewed and consolidated all facilities and demands of Water Use Permits 13-00017-W, 13-00037-W and 13-00040-W into one permit. It was issued with a duration of 20 years, an annual allocation of 152,741 MGY (418.47 MGD) and a maximum monthly allocation of 13,364 million gallons per month (MGM). Along with the existing wellfields and the proposed South Dade wellfield, a new FAS wellfield and RO plant were proposed in Hialeah. The Biscayne aquifer base condition was established at 347 MGD, pursuant to Section 3.2.1E of the Applicant's Handbook (AH) for Water Use Permit Applications Within the SFWMD. Additional groundwater modeling conducted during the permit review showed that an additional 5.0 MGD (1.5 MGD at Snapper Creek, 1.5 MGD at Southwest, 0.5 MGD at Newton, and 1.5 MGD at Everglades wellfields) would not cause a net increase in volume or cause a change in timing of surface and groundwater from Everglades water bodies. Groundwater and canal recharge projects were required to offset proposed increased Biscayne aquifer withdrawals beyond the calculated Base Condition limit of 347 MGD.

On November 1, 2010, the consolidated permit (13-00017-W) was modified (to remove proposed FAS blending wells and re-start the existing ASR wells) and renewed for a 20 year duration, with an annual allocation of 149,106 MGY (408.51 MGD) and a maximum monthly allocation of 13,047 MGM to provide potable water to a projected population of 2,787,451 persons in the year 2030.

On July 16, 2012, the permit was modified to add FAS facilities and allocation, modify the calculated base condition from 347 MGD to 349.5 MGD, reduce the total allocation from the Biscayne aquifer and modify the source limits from the Alexander Orr and Southwest wellfields. There were no changes to the demand projections or permit duration.

PROJECTED WATER USE DEMANDS

The Permittee estimates a 2033 population of 2,642,929 persons with a finished water per capita use rate of 137.2 (gpcd). The per capita use rate was calculated from a three year average for 2011 through 2013 (see Exhibit 7). The raw water per capita (146 gpcd) is higher due to treatment losses. The maximum monthly peaking ratio (1.05:1) was calculated by dividing the peak raw water monthly rate by the average raw water monthly rate for the three year time period of 2011 through 2013.

PROJECTED WATER USE DEMANDS (CONTINUED)

Staff recommends an annual allocation of 140,916 MG (386.07 MGD) through the year 2033. Staff further recommends a maximum month allocation of 12,330 MG based on a maximum month to average month ratio of 1.05:1. These total allocation values are lower than shown in the previous permit due to effective water conservation programs and revised population projections. See Exhibit 8A for projected demand tables and Exhibit 9 for a step chart of raw supply and finished demand.

IMPACT EVALUATION

FAS - Hialeah Wellfield:

Impacts due to the operation of the proposed Hialeah RO Wellfield were evaluated prior to the issuance of the 2010 permit. The City of Hialeah's consultant (Schlumberger Water Services) ran the East Coast Floridan Aquifer System SEAWAT model developed for the SFWMD. The model has 14 layers representing the surficial aquifer system to the Boulder Zone and includes all or part of 7 counties. The Applicant created a local scale model in the vicinity of the Hialeah RO wellfield based on the regional model. The local model has 106 rows, 112 columns and grid spacing between 75 and 2,400 feet. The 14 model layers were maintained, however the depths of some layers were adjusted based on local field data (see Exhibit 26A). The open interval of the Hialeah RO wells is within layers 3, 4 and 5 of the model. The model was calibrated to the results of a five day aquifer performance test of well R01 Hialeah with three monitor wells. Hydraulic conductivity was 90 feet per day, storativity was 5.25 x 10-7 and the ratio of horizontal to vertical hydraulic conductivity was set to 0.1 in the model.

The Hialeah wellfield includes 14 wells (including 12 primary production wells and two backup wells) with a total pumping capacity of 23.33 MGD. Pumpage in the model was distributed among all 14 wells. Predictive simulations were run for 30 years with pumpage rates varying from 13.33 MGD to 23.33 MGD. The maximum drawdown when pumping 13.33 MGD is predicted to be 65 feet. The maximum drawdown when pumping at 23.33 MGD is predicted to be 107 feet. See Exhibit 26B and 26C for drawdown maps.

FAS - South Miami Heights:

MDWASD is proposing to use the FAS as an alternative water supply source to meet the expected demands for the planned SMH wellfield. The location of the wellfield is shown on Exhibit 3L, and the well construction details are shown on Exhibit 5. MDWASD is proposing a maximum monthly withdrawal rate of 23.3 MGD raw Floridan aquifer water, which will result in 17.5 MGD of treated water, based on 75 percent treatment efficiency. The SMH FAS Wellfield consists of 8 wells with a withdrawal rate of 3.0 MGD each for a design withdrawal capacity of 24 MGD.

To assess the impacts from the proposed withdrawals from the SMH FAS wellfield, the City developed an uncalibrated MODFLOW model consistent with Section 1.7.5.2 of the AH. A report detailing the model development and results are contained in the permit file. That report describes modeling and results for an 18 MGD SMH RO

IMPACT EVALUATION (CONTINUED)

Wellfield. Additional modeling was performed subsequent to this report with a withdrawal rate of 24 MGD from 8 wells for the SMH FAS Wellfield. Individual and cumulative drawdown maps are shown on Exhibits 26D and 26E.

The closest wellfields to SMH have existing drawdowns based on the modeled results of 44.09 feet for Florida Power and Light (FPL), and 12.18 feet for Florida Keys Aqueduct Authority (FKAA), Water Use Permit 13-00005-W. Exhibit 26F shows existing legal users in the area and Exhibit 26E shows the cumulative drawdowns for existing legal users. SMH lies just outside the one foot drawdown contour of FPL and FKAA.

Results of the model run simulating SMH only with a continuous withdrawal for 90 days at 24 MGD were analyzed for the 1 foot drawdown contour. This simulation represents the cone of depression in the Upper Floridan aquifer due to pumping of only the SMH wellfield. The MDWASD ASR facility at the SWWF lies just inside the 1 foot contour, while the MDWASD WWF ASR facility, FPL and FKAA lie outside the 1 foot drawdown contour. Drawdowns were 0.58 foot at the West wellfield (WWF) ASR, 1.28 feet for SWWF ASR, 0.54 foot at FPL, and 0.21 foot at FKAA.

Results were analyzed for the continuous withdrawal for 90 days of SMH at 24 MGD and existing legal users at their permitted allocation. Drawdowns were 0.63 foot at the WWF, 1.36 feet at the SWWF, 44.63 feet at FPL, and 12.39 feet at FKAA. Exhibit 26E shows the cumulative drawdown due to pumping at SMH and existing legal users.

The WWF and SWWF ASR facilities are designed to inject freshwater for later retrieval as part of ASR operations. In order to assess possible impact to the operation of these facilities as a result of SMH withdrawals on the ASR operation, MODPATH, a particle tracking post-processing package for MODFLOW (Pollack, 1994) was run. Particles were added directly to the south of the SWWF ASR well model cells. Simulation 5 was run for 30 years first in MODFLOW, and then MODPATH was run in order to assess particle movement. The MODPATH model run was analyzed to assess the impact of SMH and the existing legal users on the SWWF ASR system. After a run of 30 years, particles traveled 365 feet from their original position. Because the residence time of fresh water injected into the ASR wells will typically be around 6 months, the travel distance of the fresh water bubble should be substantially less than that calculated for 30 years and should not have a significant impact on the ability of the ASR wells to recover the fresh water bubble.

Biscayne Aquifer:

For the 2010 permit issuance, modeling was performed to assess impacts from the existing and proposed withdrawals on the Biscayne aquifer. The Applicant used the SFWMD Lower East Coast subRegional (LECsR) MODFLOW model, modified to meet the requirements for permit applications. The model is documented in a draft SFWMD publication dated March 2006. The model cells are 704 feet by 704 feet and

IMPACT EVALUATION (CONTINUED)

the model domain extends from the St. Lucie Canal and River in Martin County south to Biscayne Bay in Miami-Dade County. Additionally, it extends from the western boundaries of Martin, Palm Beach, Broward and Miami-Dade counties to the Atlantic Ocean. The model has daily time steps and simulates 14 years from January 1986 to September 1999.

For the 2010 permit, the model was calibrated for the time period July 1988 to March 1990. This 21 month period included three months of average rainfall conditions followed by 15 months of 1-in-10 year drought conditions and then three months of average conditions. This time period was also used for the predictive runs. The C-100, C-102, C-103, C-1, C-1 N, C-1W and L-31 canals were calibrated to flow data between water control structures. Monitor wells at each wellfield were used to check local calibration and at least three wells at each wellfield had model water levels that were within one foot of actual water levels for the 1-in-10 year drought period. Permitted users within the 0.1 foot cone of influence of each wellfield were included in the cumulative model runs submitted by the applicant. These 2010 predictive model scenarios are listed in Exhibit 23.

Effects of Shifting Base Condition Allocation from Alexander Orr to Southwest Wellfield:

Base Condition water use was established for each Biscayne aquifer wellfield, consistent with Section 3.2.1E of the AH, in the permit issued in 2007. In 2010 the permit was modified allowing the withdrawal of up to 388 MGD of groundwater from the Biscayne aquifer. This quantity of water was granted based (in part) on an evaluation of the impact of MDWASD's groundwater withdrawals on Regional Waterbodies under its Base Condition Water Use and its requested allocation. As defined by Section 3.2.1.E of the AH, Base Condition Water Use is the maximum quantity of water withdrawn during a consecutive 12-month period between 2001 and 2006. The amount of seepage from Regional Waterbodies (primarily SFWMD Canals and Everglades National Park) induced by MDWASD's groundwater pumpage under Base Conditions was evaluated with the LECsR groundwater model developed by the SFWMD. This model was also used to evaluate the impacts associated with MDWASD's projected water demands. As many of MDWASD's wells did not have flow meters, the Base Condition groundwater pumpage rates for several wellfields were estimated. Exhibit 10C shows the Base Condition groundwater pumpage rates for MDWASD's Biscayne aquifer wellfields established in 2007, as well as the Modified Base Condition resulting from subsequent modeling and a shift of base condition from this permit to the City of North Miami Beach (Water Use Permit 13-00060-W).

In compliance with Limiting Condition 17 of the 2007 permit, MDWASD began installing flow meters on all of its wells and recalibrating wells with existing flow meters. It was discovered that the actual capacity of the Alexander Orr Wellfield was on the order of 35 MGD, which is approximately 27 MGD less than that assumed for the Base Condition (62 MGD).

IMPACT EVALUATION (CONTINUED)

Limiting Condition No. 31 limited annual withdrawals from the SWWF to 85.9 MGD. However, the capacity of the SWWF is considerably higher (approximately 161 MGD). MDWASD requested to shift 20 to 30 MGD of groundwater pumpage from the Alexander Orr Wellfield to the SWWF to maximize its production capabilities at the Alexander Orr WTP.

The LECsR model was used by the Applicant's consultant to evaluate the impacts on Regional Waterbodies resulting from the proposed shift in Base Condition allocation. A technical report documenting the modeling effort and the results is contained in the permit file. The modeling compared withdrawals from the Alexander Orr and SWWF as established in the previous permit and the proposed shift in allocation from Alexander Orr wellfield to the SWWF. Several potential scenarios were modeled. For each scenario, seepage rates from all potential Regional Waterbodies were calculated using the USGS MULTIBUD program. Regional Waterbodies used in this analysis are shown on Exhibit 25E.

According to the LECsR model simulations, MDWASD's proposed shift of pumpage from the Alexander Orr Wellfield to the SWWF would result in approximately one to three MGD of additional seepage from the upper reaches of the C-2 and C-1W Canals (MULTIBUD Zones A and D) to the Biscayne aquifer, relative to the seepage that occurs under Base Conditions. Approximately 4 to 10 MGD more groundwater would discharge from the Biscayne aquifer to the lower portion of the C-2 Canal (MULTIBUD Zone B), relative to Base Conditions. In the C-1 Canal (MULTIBUD Zone E), the net additional seepage, relative to Base Conditions, is similar under all scenarios evaluated. The additional seepage that occurs in the C-100C Canal (MULTIBUD Zone L), L-31N Canal (MULTIBUD Zone M), and the C-4 Canal (MULTIBUD Zone N) is less than 0.3 MGD for all scenarios. Overall, the total simulated change in seepage, relative to Base Conditions, is a 2 to 6 MGD decrease in the seepage from the canal system to the Biscayne aquifer, relative to Base Conditions. Exhibit 25F shows the difference in net seepage on a monthly basis for the modeling scenarios. The modeling results indicate that the proposed pumping would not cause an increase in canal seepage to the Biscayne aquifer, and the implementation of any scenario would not cause additional indirect withdrawals from Regional Waterbodies.

WATER RESOURCE IMPACT EVALUATION

Water Resource Availability

Biscayne Aquifer

There are two major aquifer systems in Miami-Dade County, as discussed in the United States Geological Survey (USGS) Water Resource Investigations Report 90-4108. Overlying the FAS in Miami-Dade County is a 550- to 800-feet thick sequence consisting of sediments having relatively low permeability, referred to as the intermediate confining unit. Overlying the intermediate confining unit is the surficial aquifer system, the source of freshwater supplies for Miami-Dade County and for

WATER RESOURCE IMPACT EVALUATION (CONTINUED)

most of southeast Florida. The surficial aquifer system base is -180 to -220 feet National Geodetic Vertical Datum (NGVD) and includes the Biscayne aquifer and the gray limestone aquifer. The base of the Biscayne aquifer is 80 to 100 feet below land surface (bls) at all the Miami-Dade public water supply wellfields except the Hialeah/Preston, Miami Springs and Medley wellfields, where the aquifer base is 130 to 150 feet bls.

According to USGS aquifer performance tests in the area, the transmissivity of the Biscayne aquifer is approximately 500,000 square feet per day (ft2/d) at most of the Miami-Dade wellfields. At the Northwest and West wellfields, the transmissivity is 1 million ft2/d and at Alexander Orr and Snapper Creek the transmissivity is 750,000 ft2/d.

Land surface elevations in Miami-Dade County average 5 to 10 feet NGVD, with coastal dune remnants reaching 15 to 20 feet NGVD. The approximate dry season depths to water at the wellfields are as follows:

Northwest: 6' (-1' NGVD)
Preston: 14' (-5' NGVD)
Miami Springs: 7' (-1' NGVD)
West: 3' (3' NGVD)
Southwest: 13' (-4 NGVD)
Snapper Creek: 8' (-3' NGVD)
Alexander Orr: 13.5' (-5.5' NGVD)
Naranja: 4' (2' NGVD)
Newton: 4.5' (1.5' NGVD)
Everglades: 3' (2' NGVD)
Leisure City: 4' (2' NGVD)
Elevated Tank: 6' (3' NGVD)
South Miami Heights: 6' (2' NGVD) predicted

The water levels are based on monitor well data for the north wellfields and from results of modeling data in 2030 at the Southwest, Alexander Orr and South system wellfields. In the dry season, approximately 86 feet of the Biscayne aquifer would remain saturated.

Sources of recharge to the surficial aquifer system in Miami-Dade County are: (1) infiltration of rainfall or irrigation water; (2) infiltration of surface water and groundwater imported from the water-conservation areas/Everglades National Park; (3) infiltration of urban runoff by way of drains, wells, or ponds; and (4) groundwater inflow from southwestern Broward County. Recharge by rainfall is greatest during the wet season, from June to November, and recharge by canal seepage is greatest during the dry season, from December to May. Water level data is collected from an extensive USGS monitor network (see Exhibits 29A, 29B and 30). These data indicate that groundwater flows from western Miami-Dade County towards the coast and fluctuates

approximately two feet from wet to dry season.

The Preston, Medley, and Miami Springs wellfields are adjacent to the C-6 canal upstream of the S-26 structure, which is operated to maintain a headwater elevation of 2.5 feet NGVD. The Alexander Orr and Snapper Creek wellfields are adjacent to the C-2 canal upstream of the S-22 structure, which is operated to maintain a headwater elevation of 2.9 feet NGVD. The two SMH proposed wellfields are in the vicinity of the C-1W and C-1N canals upstream of the S-21 structure, which is operated to maintain a headwater elevation of 2.0 feet NGVD in the dry season and 2.4 feet NGVD in the wet season. Monitor wells have been installed to observe the impact of new or increased pumpage near these regional canals. See Exhibits 33A and 33B for location maps and Exhibit 33C for a table of well information.

Based on historic data for existing wellfields and model results for proposed withdrawals, the potential for harm to occur to the water resource availability of the Biscayne aquifer as a result of withdrawal of the recommended allocation is considered minimal.

Upper Floridan Aquifer

The deeper aquifer system in Miami-Dade County is commonly known as the FAS and it is present in all of Florida and parts of adjacent states. USGS Water Resource Investigation (WRI 94-4010) is a study of the FAS in southeastern Florida. In Miami-Dade County, the top of the FAS occurs at about -950 to -1,000 feet NGVD. The FAS is divided into three general hydrogeologic units: (1) the Upper Floridan aquifer, which contains brackish groundwater, (2) the Middle confining unit, which contains saline groundwater, and (3) the Lower Floridan aquifer, which contains groundwater closely resembling seawater. The Upper Floridan aquifer, where Miami-Dade's ASR and RO wells are completed, is generally 500 to 600 feet thick, and its transmissivity has been measured to be as high as 31,000 ft2/d. Transmissivities for the ASR wells at the SWWF were measured ranging from 9,451 to 22,873 ft2/day. Transmissivities for the ASR wells at the WWF ranged from 10,293 to 19,650 ft2/day.

Groundwater movement in the upper Floridan aquifer is generally southward to the Gulf of Mexico and the Atlantic Ocean from recharge areas in central Florida. In southern Florida, the FAS is a confined aquifer with potentiometric head elevations of 30 to 50 feet NGVD in Miami-Dade County. There are no current water level maps of the upper Floridan aquifer available to determine actual water levels at the permittee's facilities. Special Conditions 36 and 37 require water level and chloride monitoring of one standby well at each of the upper Floridan aquifer wellfields in this permit. See Exhibit 32A and 32B for a map and table of FAS wells monitored by MDWASD. Modeling was conducted for impact assessment purposes for the previous permit. Model results predicted maximum drawdowns of 65 feet at the Hialeah RO wellfield when pumping 13.33 MGD (see Exhibit 26B). Model results for the SMH RO Wellfield predict drawdowns of 40 to 50 feet in the vicinity of the wellfield at a maximum

withdrawal rate of 24 MGD for 90 days and no recharge (Exhibits 26D and 26E).

Water levels in the upper Floridan aquifer will remain approximately 970 feet above the top of the aquifer at the location of maximum drawdown. Based on model results, the potential for harm to occur to the water resource availability of the aquifer as a result of the withdrawal of the recommended allocation is considered minimal.

Existing Legal Users

Biscayne Aquifer

An existing legal user is a water use that is authorized under an SFWMD water use permit or is existing and exempt from permit requirements (domestic uses). A map of existing public water supply permits in Miami-Dade County is shown in Exhibit 4A. Monitor data indicate that the existing withdrawals result in a maximum depth to water of 12 to 14 feet bls at the center of the Preston, Alexander Orr and Southwest wellfields. The other wellfields have depths to water of three to seven feet bls.

Modeling performed for the previous permit demonstrated that the proposed withdrawals from the various Biscayne aquifer wellfields would not cause harm to existing legal users. No increase in withdrawals from any of the Biscayne aquifer wellfields is proposed, and the Snapper Creek Wellfield allocation is reduced by 27.9 MGD (from 199.19 MGD to171.3 MGD [Exhibit 10A]).

Based on observation of historic data and the predicted impact based on model results, the withdrawals from the Biscayne aquifer are not anticipated to result in the inability of an existing legal user to withdraw water, change the quality of the water to the extent that it can no longer be used for its authorized purpose, or prevent an existing legal user from meeting its permitted demands without exceeding the permitted allocation.

Upper Floridan Aquifer

Hialeah RO wellfield:
The existing legal users of the upper Floridan aquifer in Miami-Dade County and southern Broward County are mapped on Exhibit 4B and listed on Exhibit 4C.

The nearest permitted user to the Hialeah Floridan aquifer wells is the City of Miramar, whose closest well is approximately three miles from the northernmost Hialeah RO wellfield well (see Exhibit 4B for location). Model results predict the proposed withdrawals will result in an additional decline in water level of less than 20 feet at the nearest Miramar well, which would result in water levels at or above land surface and approximately 1,000 remaining feet of available drawdown. Solute transport model results predicted an increase in the concentration of total dissolved solids (TDS) of 135 milligrams per liter (mg/L) after 20 years of pumping at a distance of 2 miles from the wellfield. The increase in TDS is considered by staff to be minimal.

WATER RESOURCE IMPACT EVALUATION (CONTINUED)

SMH RO wellfield:
The nearest existing legal users to the SMH Wellfield are the FKAA (Water Use Permit 13-0005-W) and FPL Turkey Point Power Plant. Results of the model run simulating SMH only with a continuous withdrawal for 90 days at 24 MGD were analyzed within the 1 foot drawdown contour. This simulation represents the cone of depression in the upper Floridan aquifer due to pumping of only the SMH wellfield. The MDWASD ASR facility at the SWWF lies just inside the 1 foot drawdown contour, while the MDWASD WWF ASR facility, FPL and FKAA lie outside the 1 foot drawdown contour. Exhibit 26D shows the extent of the drawdown due to pumping at SMH. Drawdown is predicted to be 0.58 foot for the WWF ASR site, 1.28 feet for SWWF ASR site, 0.54 foot for FPL, and 0.21 foot for FKAA.

In addition, results were analyzed for the continuous withdrawal for 90 days of SMH at 24 MGD and existing legal users at their permitted allocation. Drawdowns were predicted of 0.63 foot at WWF, 1.36 feet at SWWF, 44.63 feet at FPL, and at 12.39 feet at FKAA. Exhibit 26E shows the cumulative drawdown due to pumping at SMH and existing legal users.

The predicted impact on existing users, based on model results, is considered by staff to be minimal. Therefore, the proposed use of the upper Floridan aquifer is not anticipated to result in the inability of an existing legal user to withdraw water, change the quality of the water to the extent that it can no longer be used for its authorized purpose, or prevent an existing legal user from meeting its permitted demands without exceeding the permitted allocation.

Existing Off Site Land Uses

Biscayne Aquifer

Land uses that are dependent upon water being on or near land surface and that existed prior to this application are protected from harm. The surrounding land uses at each of the wellfields are as follows:

North System Wellfields:
Preston - residential north, east and west, industrial/commercial south
Miami Springs Upper - in residential neighborhood with schools and parks
Miami Springs Lower - on golf course with residential on all sides
Northwest - rock mining to north, south and east, undeveloped to west

Central System Wellfields:
Alexander Orr - residential to east and west, commercial to south, WTP to north
Snapper Creek - residential to east, west and south, commercial to north
Southwest - residential on all sides, commercial to south, rural residential/agricultural to north
West - agricultural to east, south and west, undeveloped to north

South System Wellfields:

WATER RESOURCE IMPACT EVALUATION (CONTINUED)

Everglades Labor Camp - residential to east and south, agricultural to north and west
Newton - residential on all sides
Former Plant - residential on all sides and commercial to south
Roberta Hunter Park - residential on all sides

All wellfields will remain at current withdrawal rates. No problems have been reported due to historic pumping from these facilities.

Model results in the area of the proposed SMH wellfields predict less than 0.1 foot of drawdown at the nearest lakes to the east and west, respectively. There are no impacts on adjacent lakes from withdrawals at the Newton wells, which will increase by 0.5 MGD. Withdrawals at the Everglades Labor Camp wells increase by 1.5 MGD from 0.7 MGD, which results in drawdowns of about 0.1 foot at the edge of the adjacent farms.

Pursuant to 3.6.2 of the AH, the use is not expected to result in significant reduction in water levels on the property of an existing offsite land use to the extent that the designed function of a water body and related surface water management improvements are damaged (not including aesthetic values), damage to agriculture, including damage resulting from reduction in soil moisture resulting from water use, or land collapse or subsidence caused by reduction in water levels associated with water use.

Upper Floridan Aquifer

Impacts on ASR Wells
Land uses that are dependent upon water being on or near land surface and that existed prior to this application are protected from harm. The WWF and SWWF ASR facilities inject fresh Biscayne aquifer water for later retrieval as part of ASR operations. The cone of influence for the Hialeah RO wellfield does not extend to the West and Southwest ASR wells, however the proposed SMH FAS wellfield cone does (Exhibit 26E). In order to assess possible impact as a result of the SMH FAS withdrawals on the ASR operation, MODPATH, a particle tracking post-processing package for MODFLOW (Pollack, 1994) was run. Particles were added directly to the south of the SWWF ASR well model cells. Simulation 5 was run for 30 years first in MODFLOW, and then MODPATH was run in order to assess particle movement. The MODPATH model run was analyzed to assess the impact of SMH and the existing legal users on the SWWF ASR system. After a run of 30 years, particles traveled 365 feet from their original position.

Pursuant to 3.6.2 of the AH, the use is not expected to result in significant reduction in water levels on the property of an existing offsite land use to the extent that the designed function of a water body and related surface water management improvements are damaged (not including aesthetic values), damage to agriculture, including damage resulting from reduction in soil moisture resulting from water use, or

land collapse or subsidence caused by reduction in water levels associated with water use.

Migration of Saline Water

Biscayne Aquifer

Inland movement of sea water in Miami-Dade County began in the 1920's and 1930's when canals were constructed that lowered groundwater levels. In the 1940's salinity control structures were installed in the canals as far seaward as possible, which prevented unimpeded inland saltwater flow. In the 1960's other structures were installed along the canals and water levels were stepped down, which lowered water levels at the final "step" before discharging to tide. This resulted in some inland movement of saltwater. Beginning in 1976, additional water was routed to the county, raising water levels along the coast and slowing or reversing inland movement of the saltwater front. In addition, withdrawals have been reduced at coastal wellfields when western wellfields became operational.

The SFWMD operates numerous salinity control structures in Miami-Dade County. The water control levels were discussed in the Water Resource Availability section above. Additional protection for the central wellfields is provided by the construction of a water control structure located on the Ludlum Canal, south of S.W. 88th Street and east of the Alexander Orr wellfield and U.S. Highway 1, completed in May 2004, to further reduce the potential for saltwater intrusion.

Miami-Dade County has a five year cooperative agreement with the USGS to collect water level data from 117 monitoring wells, chloride data from 66 saltwater interface monitoring stations and induction logs from 33 of the wells as part of a saline water intrusion monitor network. Additionally, a total of 36 water level monitoring stations, and one saltwater intrusion monitoring well not funded by MDWASD are sampled by the USGS (See Exhibit 28B). Since 2007, 12 new saline intrusion monitor wells have been installed in the county. Water levels are monitored continuously at some stations,and monthly, every two months, quarterly, semi-annually, or annually for some others. Chloride sampling is done monthly, quarterly, or annually depending on location and induction logs are collected annually for select wells. Current monitoring facilities are listed in Exhibit 28A and are mapped on Exhibits 27A through D.

Of the 48 monitor wells sampled in Miami-Dade County, 16 are east of the 1,000 mg/l isochlor line defined in 2008, to monitor saltwater movement as opposed to being early warning wells. The saline water interface in the Biscayne aquifer, as delineated in 2008 and 2011, can be seen on Exhibit 27A through 27C. All 10 wells east of the saltwater front from the Broward County line to the C-2 Canal have been showing an increasing trend in chloride concentration, which indicates a regional cause for the movement rather than localized well withdrawals. The Permittee's nearest wellfields to the 2011 saltwater front are Miami Springs Lower (1.75 miles) and Hialeah (2.1 miles) in the north system and Alexander Orr (3.1 miles) in the central system. These wellfields are a significant distance from the saltwater front compared to the slow rate

WATER RESOURCE IMPACT EVALUATION (CONTINUED)

of movement and no increases in allocation are authorized from any of the Biscayne aquifer wellfields. In addition, continued monitoring is required in this permit pursuant to Special Condition 37.

For the proposed SMH and Former Plant Wellfields, modeled drawdowns from the three MGD scenario were plotted and analyzed to determine the potential for inducing saline water intrusion. There are regional canals surrounding the wellfield that are maintained at levels to reduce the potential for saline intrusion. The model results indicate that the cone of depression does not extend to these canals (Exhibit 25D). Therefore, the proposed withdrawals will not cause further net inflow of water from the saline source toward the withdrawal points.

Pursuant to Section 3.4 of the AH, the existing and proposed use will not cause saline water intrusion because the use is not expected to cause further net inflow of groundwater from the saline water source toward the withdrawal point.

Upper Floridan Aquifer

Water in the upper Floridan aquifer in southeastern Florida is brackish with chloride and dissolved-solids concentrations generally greater than 1,000 mg/L. Salinity in the Upper Floridan aquifer usually increases with depth. The Lower Floridan aquifer contains water with a salinity similar to that of seawater. Because of the relative lack of development of the FAS in southeastern Florida, the quality of groundwater in the aquifer system is considered to have remained virtually constant during the period 1940 to 1990. USGS WRI 94-4010 mapped the base of the brackish water zone at approximately -1,800 feet bls. The Floridan aquifer wells at the Hialeah and SMH Wellfields are designed to be approximately 1,200 to 1,300 feet bls. Chloride concentrations at the Hialeah RO site are currently about 1,780 mg/l. Chloride concentrations at the proposed SMH wellfield are unknown but are assumed to be similar to the Hialeah RO Wellfield. Increases in salinity will result in an increase the treatment losses and additional withdrawals may become necessary to meet finished water demands. Special Condition 37 requires that the applicant sample for chloride concentration at the production wells to monitor for increases in concentration which could indicate upconing and affect the RO treatment efficiencies (see Exhibits 32A and 32B).

Pursuant to Section 3.4.1 of the AH, the proposed use from the upper Floridan aquifer may cause limited increases in salinity but not to the extent of interfering with presently existing legal users, otherwise harming the resource, or rendering the resource no longer usable by the Permittee.

Wetland Environments

Biscayne Aquifer

This water use modification includes only a reduction in pumpage from the Biscayne aquifer. Therefore, the wetland evaluation completed in 2007 that was conducted for

WATER RESOURCE IMPACT EVALUATION (CONTINUED)

the previous water use permit processed under Application 040511-5, which was also utilized for the previous water use permits processed under Applications 091228-14 and 110511-6, for which the authorized allocations were relatively the same for each permit, has again been utilized for this permit modification with a few minor additions as noted below.

Wetlands were identified within the area of influence of 4 of the 12 Biscayne aquifer wellfields: WWF, SWWF, Snapper Creek wellfield, and Northwest wellfield. These wetlands primarily consist of Category 2 (seasonally inundated) wetlands; however, the WWF and the Northwest wellfield also include Category 3 (temporarily flooded or saturated) which are the most susceptible to harm resulting from hydrologic changes.

To assess Biscayne aquifer withdrawal impacts on groundwater levels within the wellfields, water levels monitoring data was utilized. In addition, calibrated modeling results were also utilized where monitoring data was not available within the area of wetlands. It should be noted that although the hydrology of the wetlands is supported by the surficial aquifer system, the Biscayne aquifer is highly transmissive in the region of these wellfields.

West Wellfield:
For the WWF the modeling predicts that a maximum of 0.5-foot of drawdown could potentially occur underneath approximately 5 acres of Category 3 wetlands located within the area of influence of that wellfield (Exhibit 24A), which is limited to withdrawals of 15 MGD. In 2009, an additional water level monitor well (G-3898) with a continuous water level recorder, was installed to monitor surface water and groundwater levels within the vicinity of the Category 3 wetlands. A review of historical aerial photographs, field surveys and review of pumpage and monitor well data was conducted, which resulted in a determination that no wetland harm had previously occurred from the historic withdrawals from the Biscayne aquifer in the WWF, and no increases are authorized in this permit modification. In addition, it should be noted that withdrawals from the West wellfield are not anticipated to harm wetlands within Everglades National Park (ENP) as the boundaries of ENP are located outside of the area of influence of the modeled water use. Specifically, a "four party" agreement which includes ENP, the District, the State of Florida, and Miami-Dade County was created to provide reasonable assurance that withdrawals from the WWF will not cause harm to the hydrologic resources of ENP (see Exhibit 35A through I). The agreement requires Miami-Dade County to reduce or stop pumpage from the WWF at any time, if ENP determines that harm due to the withdrawals from WWF has occurred, as measured by an existing comprehensive monitoring network within the area.

Southwest and Snapper Creek Wellfields:
For the Southwest and Snapper Creek wellfields, a groundwater monitor well (G-3897) was installed in the southwest portion of the SWWF in 2008, within the vicinity of wetlands, as required by the previous permit processed under Application 040511-

WATER RESOURCE IMPACT EVALUATION (CONTINUED)

5. Under the previous permit processed under Application 110511-6, modeling was conducted to evaluate additional drawdowns within the Southwest wellfield that would result from shifting pumpage from the Alexander Orr wellfield to the Southwest wellfield. The modeling predicted a maximum of 0.2-foot of additional drawdown (beyond that depicted in the previous permit authorized under Application 091228-14) could potentially occur underneath the wetlands (Exhibit 25C).

Northwest Wellfield:
For the Northwest wellfield the modeling predicts that a maximum of 0.5-foot of drawdown could potentially occur underneath approximately 1,000 acres of Category 3 wetlands located within the wellfield area of influence (Exhibit 24A). The 0.5 foot drawdown contour extends approximately 2 miles out from the withdrawal facilities to the edge of the proposed Comprehensive Everglades Restoration Plan (CERP) Dade-Broward Levee/Pennsuco project component. As a result, a groundwater monitor well (G-3818) is located within the wetlands, along with other monitor wells within the vicinity, as depicted on Exhibit 29E. Wetland impacts associated with historical withdrawals in the Northwest wellfield were previously mitigated in 1999 for withdrawals up to 155 MGD. In addition to the mitigation, in 2001 the MDWASD installed two monitor wells in the Pennsuco wetlands, and a water control structure for the Northwest Wellfield Protection Canal, known as the Mid-canal structure and bridge (MCSB), in 2003, in the locations depicted on Exhibit 21. Specifically, the MCSB structure was necessary to prevent drainage of the Pennsuco wetlands, which provided the water needed to maintain water levels in the Northwest Wellfield Protection Canal. Pursuant to Special Condition 26 of the previous permit, the MCSB structure is to be opened simultaneously with the upstream structure located on the L-30 Canal to prevent drainage of the Pennsuco wetland, in accordance with the operation letter included as Exhibit 22.

In order to provide continued reasonable assurance that the wellfield withdrawals will not result in harm to wetlands located within the wellfields area of influence, the Permittee will continue the current water levels network monitoring program in accordance with Exhibits 29A through 29E and 30, and Special Condition 36.

Based upon the above-referenced evaluations and the application of the narrative standard that the hydrologic alteration of the water use shall not adversely impact the values of wetland functions so as to cause harm to the abundance, diversity and habitat of fish, wildlife and listed species, the potential for harm to occur to wetlands as a result of the authorized withdrawal of the recommended allocation is considered minimal.

Upper Floridan Aquifer

The wetlands are separated from the Upper Floridan aquifer well drawdowns by 600 feet of low permeability material. Therefore, the upper Floridan aquifer well withdrawals do not impact the wetlands.

WATER RESOURCE IMPACT EVALUATION (CONTINUED)

Sources of Pollution

Biscayne Aquifer

Hialeah/Preston/Miami Springs area:
Groundwater from the Biscayne aquifer in the vicinity of the Hialeah/Preston/Miami Springs Wellfields is polluted with low levels of volatile organic compounds (VOCs). The wellfields were shut down in 1982 as a consequence. The United States Environmental Protection Agency (USEPA) primary remedial action to clean up the aquifer was to use the wellfields to remove contaminants and provide a water treatment system that uses air stripping. As a consequence, MDWASD constructed a treatment train comprised of 64, 14-foot diameter air stripping towers along with 2 low-lift pumping stations with 9 turbine pumps and piping. Total system design capacity varies from 152 MGD to 256 MGD, depending on the level of contaminants. The USEPA paid for 41 percent of the total project costs. Use of the air stripping towers, initiated in 1992, allowed the Hialeah/Preston/Miami Springs wellfields to begin operation again. These wellfields, along with associated treatment of the groundwater by air stripping, continue to remove VOCs from the Biscayne aquifer in this area.

Northwest Wellfield area:
Groundwater in the Biscayne aquifer beneath the 58th Street Landfill and the Resource Recovery Landfill, which are located approximately 3 miles to the east of the Northwest Wellfield , has been contaminated by leachate generated from these landfills. Due in part to concerns about the potential migration of leachate from these landfills, MDWASD and SFWMD created the Northwest Wellfield Protection Canal Modification system to create and maintain a groundwater divide between the Northwest Wellfield and the landfills (Exhibits 21 and 22). Since completion of the Protection Canal in 1991, groundwater and surface water monitoring performed by Miami-Dade County Regulatory and Economic Resources (RER) have indicated that a groundwater divide has been maintained between the Northwest Wellfield and the contaminant plume. Restrictions on urban development set forth in the Comprehensive Development Master Plan also serve to keep urbanized industrial and commercial activities east of the Turnpike Extension and away from this wellfield. Furthermore, Chapter 24 of the Miami-Dade County Code (MDCC) contains a provision empowering REP to implement emergency water conservation restrictions when such measures are needed to reduce the pumpage of that wellfield and prevent migration of groundwater contamination.

RER's various wellfield protection elements serve to significantly reduce the risk of manmade groundwater contamination being transported to unpolluted portions of the Biscayne aquifer because of wellfield pumpage. Pertinent activities and provisions include the following:
- Surveillance and regulation of operations generating hazardous waste under the provisions of the Miami-Dade County Environmental Protection Ordinance (Chapter 24 of the MDCC)
- Assessments and cleanups of sites with groundwater contamination are enforced

WATER RESOURCE IMPACT EVALUATION (CONTINUED)

under the provisions of Chapter 24 MDCC, with expedited action when the site is within a wellfield protection area.
- Qualified companies are contracted with Miami-Dade County and are available when emergency cleanups are considered necessary.
- Ongoing groundwater quality monitoring is conducted using a network of monitoring wells sited for wellfield and groundwater protection (see Exhibit 30 for a table of monitor wells sampled, Exhibit 31 for sampling frequency and constituents sampled and Exhibit 29A through E for monitor locations)

The recommended allocations are consistent with Miami-Dade County wellfield protection areas and programs. Pursuant to Section 3.5 of the AH, the use is not expected to result in altering the rate or direction of movement of pollutants, if present, to cause significant degradation of surface or groundwater quality through the induced movement of pollutants into a water resource that is not polluted.

Upper Floridan Aquifer

There are no known sources of pollution reported within the Upper Floridan aquifer. Potential pollution sources located near surface are separated from the Upper Floridan Aquifer well drawdowns by 600 feet of low permeability material. Therefore, the Upper Floridan Aquifer well withdrawals are not anticipated to impact the movement of pollutants.

FACILITY OPERATION

All primary wells within each wellfield are rotated for equal use. Each wellfield or group of wellfields has limitations on annual withdrawal rates as conditioned herein. MDWASD has operational flexibility to run the wells at varying daily rates as long as the annual average limits are not exceeded. The only wellfield with daily limitations is the West wellfield, which cannot exceed 15 MGD. In addition, the Medley wells can only be operated 2 hours per month unless authorized for emergency use. Withdrawals from the Medley wells are counted towards the annual limits for the Hialeah/Preston/Miami Springs wellfield group. The maximum monthly withdrawal rate is applied to the total pumpage from all wellfields. A summary of the operation plan in 5 year increments for the Biscayne and Floridan aquifers is shown in Exhibits 10A and 10B. The operational plan for the ASR wells is shown in Exhibit 10B. Injection of up to 25 MGD of Biscayne aquifer water into the ASR wells (15 MGD at the West Wellfield and 10 MGD at the SWWF) would occur annually from June through October. Recovery of water from the ASR wells would occur annually from December through April. The permittee intends to recover almost 100 percent of the volume of injected water with withdrawals that will continue until background Floridan aquifer water quality is encountered.

ADDITIONAL INFORMATION

Regional Issues

Minimum Flows and Levels

ADDITIONAL INFORMATION (CONTINUED)

As part of the conditions for permit issuance in Chapter 373, Florida Statutes (FS), including SFWMD implementing rules, a consumptive use permit applicant must provide reasonable assurances regarding protection of Lower East Coast Everglades and MFL Water Bodies, including the Biscayne aquifer, ENP and the Water Conservation Areas (Everglades/MFL Waterbodies).

Biscayne Aquifer MFL and Prevention Strategy:
The MFLs for the Biscayne aquifer, identifying the point at which further withdrawals would cause significant harm, are set forth in Rule 40E-8.23, Florida Administrative Code (FAC). The Biscayne aquifer is in prevention as the MFL is not expected to be exceeded over the next 20 years providing the Prevention Strategy as identified in Rule 40E-8.421(4), FAC is maintained.

The Permittee has provided reasonable assurances that the proposed allocations will not cause the coastal canal stages to drop below their minimums as no increase in withdrawals from the Biscayne aquifer are proposed. The Permittee has provided reasonable assurances that the proposed allocations are consistent with the saltwater intrusion prevention criteria in 40E-2, F.A.C. and they will be maintaining an adequate saltwater monitoring network. The permit is conditioned to require the applicant to implement alternative water supply development projects. The applicant is also working with the USGS to conduct saltwater intrusion modeling. Based on these findings, the applicant has demonstrated that the proposed use is consistent with the prevention strategy.

Everglades MFL and Recovery Strategy:
The MFLs for Everglades Waterbodies, identifying the point at which further withdrawals would cause significant harm, are set forth in Rule 40E-8.221(3), F.A.C. The Everglades MFL Waterbodies are in recovery as the MFL is not met under current system conditions. The Everglades MFL Recovery Strategy is identified in Rule 40E-8.421(1) and (2), FAC.

The primary component of the MFL recovery strategy is implementation of the Everglades restoration projects, including CERP. The Everglades MFL recovery strategy also includes limitations on impacts to the MFL Waterbodies due to consumptive use permit withdrawals in Section 3.9.1 of the AH.

Section 3.9.1 of the AH requires the permit applicant to demonstrate the impact of the proposed withdrawal will be corrected through implementation of the recovery strategy, including Everglades restoration under CERP, and that the level of impacts from the proposed allocation would not exceed those authorized under the permits under review for renewal. A pumpage value higher than 347 MGD was used in the analysis to develop the recovery strategy and the Everglades water body impacts above 343.7 MGD are being offset by the Permittee. As a result, the MFL recovery plan requirements are met.

ADDITIONAL INFORMATION (CONTINUED)

Regional Water Availability

Allocation restrictions in the Lower East Coast Service Areas 1, 2 and 3, (Section 3.2.1.E of the AH) ensures that continuing and increasing consumptive use withdrawals in identified portions of Miami-Dade, Broward, and Palm Beach Counties are consistent with Everglades restoration and MFL recovery plans, including CERP. Several technical evaluations were conducted to provide reasonable assurances pursuant to Regional Water Availability Rule requirements. These evaluations, along with staff findings and recommendations under these rules, are outlined below:

Pursuant to Section 3.2.1.E of the AH, the requested allocation cannot cause a net increase in the volume or cause a change in timing on a monthly basis of the surface and groundwater withdrawn from the Lower East Coast Everglades Waterbodies over base condition water use withdrawals from such Waterbodies. For public water supplies, the base condition water use is that withdrawn over any consecutive 12 month period during the 5 years preceding April 1, 2006.

Pumpage records for the five years preceding April 1, 2006, were used to establish a base condition water use from the Biscayne aquifer, consistent with Section 3.2.1.E of the AH. It was determined that Miami-Dade County's historic Biscayne aquifer base condition water use was 352.8 MGD. Subsequent modeling performed to maximize wellfield limits and an adjustment for a transfer in base condition allocation to the City of North Miami Beach results in a Modified Base Condition of 349.5 MGD (Exhibit 10C).

Exhibit 10C lists how the historic base condition of 352.8 MGD is broken down by wellfield as well as the adjustments for the City of North Miami Beach and the modeling adjustments which result in an adjusted base condition of 349.5 MGD. Miami-Dade County will meet the remainder of the projected increase in raw water demands (36.5 MGD) from the Floridan aquifer.

In summary, Staff determined that the Alternative Water Supply (AWS) Plan submitted by MDWASD (Exhibit 13) and the reduction in Biscayne aquifer allocation to 349.5 MGD (the modified base condition) provides reasonable assurances that the proposed permit does not cause a net increase in the volume or change in timing on a monthly basis of surface and groundwater withdrawn from the Lower East Coast Everglades over that which occurred under the base condition water use.

CERP Projects:
There are several CERP projects within Miami-Dade County: Biscayne Bay Coastal Wetlands, Broward County Water Preserve Area Water Conservation Area (WCA) 3A/3B Seepage Management, C-111 Spreader Canal, and ENP Seepage Management Project (see Exhibit 34).

The goal of the Biscayne Bay Coastal Wetlands project is to restore coastal wetlands

ADDITIONAL INFORMATION (CONTINUED)

and provide more natural overland freshwater discharges to Biscayne Bay. The project consists of constructing and operating a series of pumps, culverts canal improvements and ditch infilling. The northernmost flow-way will be located near the Deering Estate, the southernmost flow-way will be located in the Cutler wetlands near the C-1 Canal, while a series of culverts and pump stations will be installed between the C-102 and C-103 Canals to re-establish sheet flow to the east of the L-31E Canal. The Cutler location is immediately north of the Miami-Dade South Wastewater Treatment Plant (SDWWTP). In the Florida Department of Environmental Protection (FDEP) Consent Order for the SDWWTP, Miami-Dade County committed to be the local sponsor for the South Miami-Dade Reuse project which will benefit the Biscayne Bay Coastal Wetlands Project by providing new water in the form of reuse to the project. MDWASD plans on providing approximately 89 MGD of wastewater to be reclaimed for this project (see Special Condition 42).

The WCA 3A/3B Seepage Management Project objective is to reduce the rate of seepage from Water Conservation Areas 3A and 3B by increasing groundwater levels by one foot in the seepage management area using water captured from storm events. Withdrawals from the Northwest wellfield were included in the analysis of the project design and no increases from the wellfield are included in this permit renewal.

The ENP Seepage Management Project includes four components: L31N (L-30) Seepage Management Pilot Project, Dade-Broward Levee, Bird Drive Recharge Area and S-356 Structure Relocation. The purpose of the L31N (L30) Seepage Management Pilot Project is to investigate technologies to manage seepage along the L-30 and L-31N canals while providing adequate wet season flows to the WWF and Biscayne Bay. The Dade/Broward Levee component includes building a new Dade/Broward levee and canal to reduce seepage losses to the east from WCA-3B and the Pennsuco wetlands. The Bird Drive Recharge Area's purpose is to recharge groundwater and reduce seepage from ENP by increasing water table elevations east of Krome Avenue.

The C-111 Spreader Canal Western Project's goal is to improve the quantity, timing, and distribution of water delivered to Florida Bay via Taylor Slough, and improve hydroperiods and hydropatterns within the Southern Glades and Model Lands. The future C-111 Spreader Canal Eastern Project is intended to increase sheetflow within the Southern Glades and Model Lands as a means of more naturally delivering water to Florida Bay. There are no MDWASD withdrawals in the vicinity of the C-111 Spreader Canal projects.

Based on best available information, it is reasonable to assume that negative impacts to CERP projects will not occur as a result of this renewal. Pursuant to Special Condition 45, if the use of water becomes inconsistent with implementation of CERP or causes harm to a CERP project, the permit shall be modified.

ADDITIONAL INFORMATION (CONTINUED)

Monitoring Plan:
The Permittee currently has a water level and water quality monitoring program conducted by the USGS and Miami-Dade RER, respectively. The water level data are used to monitor impacts of withdrawals on wetlands, existing users and the regional canal system. The water quality monitoring program determines water quality within the wellfields and identifies groundwater contaminants. The USGS also collects chloride data from a series of wells along the coast to monitor for saline water intrusion. Six existing and one proposed FAS wells are sampled monthly for chlorides and have continuous recorders for potentiometric heads. Pursuant to Special Conditions 36 and 37, MDWASD submits annual monitoring program summary reports. The annual report summarizes hydrologic and water quality conditions ascertained from the monitoring data collected. The report includes review and analysis of the data collected and recommendations regarding the monitoring network.

Water Reservations

Nearshore Central Biscayne Bay Water Reservation:
The Project is located within the portion of Miami-Dade County which covers the water reservation area for Biscayne Bay as identified in Rules 40E-10.021 and 40E10.061, FAC. The Project is withdrawing groundwater which, in accordance with Section 3.11.3 of the AH, is not considered a withdrawal of reserved water.

Project Site Issues

Legal Control and Land Use

The Permittee maintains legal control and/or has legal access to all facilities in its service area.

Existing and Proposed Service Area and Interconnects:
MDWASD supplies treated water on a volume basis to most of the municipally owned water utilities of Miami-Dade County, with the exceptions of Florida City and North Miami Beach and a portion of the water requirements of the City of North Miami. A map showing the MDWASD Service Areas is presented as Exhibit 2B. Exhibit 11 lists the Miami-Dade wholesale customers and water delivered for the years 2008 through 2014. For those municipalities that distribute the MDWASD water themselves, all have a large user agreement for the duration of this permit except the City of Hialeah. The City of Hialeah has provided a letter of intent to sign an agreement and will be required to complete the agreement within six months of permit issuance, pursuant to Special Condition 38.

The Hialeah-Preston and Alexander Orr, Jr. WTPs are connected via their distribution systems (Exhibit 2B). There is no direct, metered interconnect between the two systems, however, it is estimated that approximately 40 MGD of finished water can be transferred between the systems. The 5 existing WTPs of the South Miami-Dade Service Area currently share a 48-inch interconnection with the Alexander Orr Jr.

ADDITIONAL INFORMATION (CONTINUED)

WTP. The two proposed wellfields are to be added to the South Miami-Dade Service Area. An interconnection to the Alexander Orr Jr. WTP system is planned for the future South Miami-Dade Membrane and RO Plants. There are also emergency interconnects to adjacent utilities in the cities of North Miami, North Miami Beach and Homestead (Exhibits 12A through C).

Facilities:
Hialeah-Preston WTP: The John E. Preston WTP-Hialeah WTP has a combined rated capacity of 225 MGD. The total installed capacity for Hialeah-Preston WTPs is 235 MGD. The Hialeah and John E. Preston WTPs treatment process includes primarily lime softening, disinfection, and filtration.

Hialeah RO WTP: Phase 1 of the Hialeah RO Plant was completed in December, 2013. Of the 10 MGD produced, 5 MGD is routed to the MDWASD transmission line through a 36-inch line along NW 170 Street, and enters the MDWASD transmission pipelines via connection at 179th Street and NW 87th Ave. Five MGD is routed to the City of Hialeah transmission system, and routed through a 30-inch line from NW 166th Street, down south along NW 97th Ave, and will enter into the City of Hialeah system at NW 154th Street and NW 97th Ave. The design build-out of the Hialeah RO plant is for a capacity to treat 13.3 MGD of raw water to produce 10 MGD of finished water (Exhibit 10B).

Alexander Orr: The Alexander Orr, Jr. WTP has a rated capacity of 214.74 MGD and a total installed capacity of 256 MGD. The WTP utilizes lime softening with activated sodium silicate, recarbonation, chlorination, ammoniation, and filtration.

South Miami-Dade: The existing five wellfields in the South Miami-Dade area have a treatment facility that disinfects the raw water by chlorination. The Leisure City facility has a design flow of 6.48 MGD. The DERM-rated capacity for the Newton Water Plant, the Elevated Tank facility, the Everglades Labor Camp Water Plant, and the Naranja Water Plant are 2.01 MGD, 1.44 MGD, 0.96 MGD, and 1.38 MGD respectively. The future South Miami-Dade membrane and RO WTP initial design is with a capacity to treat 26.33 MGD of raw water (23.33 MGD FAS and 3 MGD Biscayne aquifer) and produce 19.5 MGD of finished water. The proposed South Miami Heights RO treatment plant will have a design finished water capacity of 17.5 MGD (23.3 MGD raw) by January 2020.

Water Conservation Plan

The elements of the water conservation plan are documented in Exhibit 18.

As part of the Interim Consumptive Use Agreement, the Permittee was required to develop a 20-year water conservation plan that included water reduction goals, actions and funding requirements to achieve the goals and milestone dates for implementation of the actions. The Permittee used the new goal-based Conserve

ADDITIONAL INFORMATION (CONTINUED)

Florida program developed by the FDEP in conjunction with the states five water management districts. The County's plan was developed for the region served by MDWASD as well as the 15 water utilities that receive wholesale water from MDWASD. Details of the actions, costs and timelines can be found in Exhibit 19A through E. The estimated reduction in demands over the life of the plan is shown in Exhibit 20 and the allocations have been adjusted to include the effects of the conservation program. Special Condition 17 requires implementation of the plan along with annual reporting of progress and 10-year audits to determine if water use adjustments are necessary.

Water Use Accounting

The Permittee uses flow meters to account for their water use. Pursuant to Special Condition 11, the Permittee shall equip any new facilities with a SFWMD approved water use acounting system before use. Pursuant to Special Condition 12, the Permittee shall recalibrate each water use accounting system every five years from the last calibration date for the duration of the water use permit and submit a record of the calibration to the SFWMD. The Permittee is advised to review Exhibit 36 for the next calibration due dates.

Permit Reporting Requirements

This water use permit has numerous reporting requirements listed as Special Conditions. The Permittee is advised to read the Special Conditions and understand the data submital requirements and frequencies to the SFWMD.

Potential Use of Reclaimed Water

Alternative Water Supplies:
The proposed permit requires the implementation of approximately 145 MGD of alternative water supplies during the next 10 years. These sources include the Floridan aquifer water to be treated with RO to produce 27.5 MGD of finished water (Exhibit 13), and reuse of at least 117.5 MGD of highly treated wastewater to reduce ocean discharges and offset Everglades impacts and for other beneficial uses. In addition, approximately 16.45 MGD of reclaimed water is currently being reused for industrial and irrigation projects (Exhibit 14).

In addition, this permit allows, under extreme wet conditions, the Permittee to request to store excess stormwater within the Floridan aquifer ASR wells. Excess stormwater is that deemed not required to achieve the restoration benefits to the Everglades Waterbodies pursuant to the CERP and the Acceler8 program. Available stormwater will be identified pursuant to Section 3.2.1.E.(5)(e) of the AH.

Use of Reclaimed Water:
Staff evaluated whether the Permittee's proposed use of water is consistent with the public interest and is reasonable-beneficial. In determining consistency with the public

ADDITIONAL INFORMATION (CONTINUED)

interest, Staff recognized the need to promote the availability of sufficient water for existing uses, future reasonable-beneficial public water supply uses, and natural systems.

The Permittee's withdrawal and use of water for public water supply impacts water supplies in the Greater Everglades, the Biscayne aquifer, and Biscayne Bay, through interception of seepage and surface water discharges. Once the water is distributed and used by the customer, it is treated and disposed of via deep well injection or ocean outfall. During the 12 month period ending in November 2014, the average daily rate of disposal for water used by MDWASD was 315 MGD (145 MGD disposed via deep well and 170 MGD disposal via ocean outfall), which nearly equals the volume of raw fresh water withdrawn from the Biscayne aquifer. By 2033, the wastewater flow is estimated to be 355 MGD.

The use of water from the Biscayne aquifer only once (especially withdrawn from sources recharged by the Everglades system) is considered inefficient under the reasonable-beneficial use test and inconsistent with the public interest, under Section 373.223, FS. In addition, the State Water Resource Implementation Rule (Rule 62-40, FAC) and District consumptive use rules require that reclaimed water be used when technically, environmentally and economically feasible.

To resolve this issue and other permit requirements, working with MDWASD, a series of alternative sources have been identified to meet the County's future needs, while increasing the use of reclaimed water. Alternative sources include the development of Floridan wells, implementation of a strong conservation program developed using the Conserve Florida Guide (a joint initiative of FDEP, the water managment districts, and others), and the high level treatment and disinfection of wastewater for reuse including aquifer recharge. Design of the West WRP is ongoing, while on hold for the Central and North plants pending evaluation of reuse options for the ocean outfall legislation (see discussion below).

Additional filtration and high level disinfection requirements for wastewater treatment has been required at the South District WTP recently imposed by the FDEP and USEPA and will result in a significant increase in the amount of reclaimed water that will be made available for reuse (for some applications, additional treatment may be required). Additionally. Chapter 2008-232, Laws of Florida, requires sixty percent of water previously discharged out the existing North and Central WWTP ocean outfalls (117.5 MGD) to be beneficially reused by 2025.

Typically, reclaimed water is treated to levels sufficient for irrigation of public access areas such as golf courses and other landscaped areas pursuant to Part III of Chapter 62-610, FAC. See Exhibit 15 for a map of public access reuse lines. For some applications of reclaimed water proposed by the permittee it will be necessary to treat wastewater to levels beyond the public access irrigation level of treatment. Each level

ADDITIONAL INFORMATION (CONTINUED)

of treatment will be determined based on the requirements of the USEPA, FDEP and any applicable County requirements.

In order to meet the reasonable-beneficial use and public interest tests, the Permittee is proposing to implement at least 117.5 MGD of reuse projects by the end of the year 2025 that return fresh water to the hydrologic cycle in a manner that provides for beneficial use. See Exhibit 14 for a list of the reuse projects. These projects include the potential use of reclaimed water to recharge the FAS and the use of up to 90 MGD of highly treated reclaimed water for cooling for the FPL nuclear and gas powered plants at Turkey Point beginning in 2022. This 117.5 MGD meets the minimum requirement of the ocean outfall legislation. In addition, 16.45 MGD of existing reuse projects serve industrial and irrigation users (See Exhibit 14).

In addition, pursuant to Special Condition 42, requires MDWASD, in consultation with the District, the FDEP, and Biscayne Bay National Park, to come to an agreement on a rehydration project for the Biscayne Bay Coastal Wetlands project on or before April 15, 2015. In the event the parties do not reach agreement on the feasibility by April 15, 2015, the Permittee shall begin development of an alternate reuse project from the South District WWTP and shall provide the District with a proposal for an alternate project including a conceptual design and schedule for implementation on or before March 15, 2016.

Based on the above, the Permit includes detailed Special Conditions (Special condition 39) requiring completion of feasibility pilot tests and implementation of projects for the purpose of assuring that the County's use of water is reasonable-beneficial and in the public interest. If any of the identified reuse projects are determined to be infeasible, the Permittee shall timely propose and implement SFWMD approved alternatives that return freshwater to the system for meeting future reasonable-beneficial uses that are consistent with the public interest.

In addition, Section 2.2.4.A of the AH requires utilities that control WTPs that have determined the use of reclaimed water is feasible in accordance with Section 403.064, FS, to provide the SFWMD with: a) the reuse feasibility study, b) the schedule for implementation of reuse, c) documentation of the amounts of uncommitted reclaimed water, and d) information regarding any local ordinances concerning the use of reclaimed water. This information, which is to be updated annually, is used by the District to assist in the implementation of the utility's reuse plan by directing other water users to the utility's reclaimed supplies. Per Special Condition 39, the Permittee shall provide annual updates regarding the County's reuse feasibility plan implementation.

Furthermore, staff recommends that Miami-Dade County continue to pursue grants, loans and other publicly funded sources of money to assist with local implementation of reclaimed water projects considered in the public interest. Such money sources may include the SFWMD's Alternative Water Supply Funding Program, other state funding

ADDITIONAL INFORMATION (CONTINUED)

appropriations and CERP federal cooperative funding. However, failure to secure funding from any or all such external sources does not relieve the County of responsibility for compliance with all permit conditions.

Permit Duration

Pursuant to Section 1.5.2, AH, the Biscayne aquifer is a source of limited availability to the extent that withdrawals result in induced seepage from the Central and Southern Florida Project. The adjusted base condition water use (349.5 MGD), reflects the demand of the population existing at the time of permit renewal and thus may be authorized for 20 years. As a result, the permit duration for such increase may be up to 20 years.

The Floridan aquifer is not a source of limited availability and therefore the permit duration may be up to 20 years for this source, pursuant to Section 1.5.2, AH.

Staff recommends a water use permit duration of 20 years as conditioned herein.

ENVIRONMENTAL RESOURCE PERMIT STATUS:

Not Applicable

RIGHT OF WAY PERMIT STATUS:

Not Applicable

RECOMMENDATIONS

Project Name: MIAMI-DADE CONSOLIDATED PWS

Application Number: 140627-12

Permit Number: 13-00017-W

RECOMMENDATION

Authorizing: The continued use of groundwater from the Upper Floridan aquifer and Biscayne aquifer for Public water supply for the MDWASD Service Area serving 2,642,929 persons in the year 2033 with an average finished water per capita use rate of 137.2 gallons per day per person and a maximum monthly to average monthly pumping ration of 1.05:1 with an annual allocation of 140,915.50 million gallons.

STAFF EVALUATION

REVIEWER:

Trisha Stone, NRM

John A. Lockwood, P.G., WU

SUPERVISOR:

Barbara J. Conmy, NRM

Jonathan E. Shaw, P.G., WU

CONSULTING HYDROGEOLOGIST:

Simon Sunderland, P.G. **Date:** February 3, 2015

WATER USE BUREAU CHIEF:

Maria C. Clemente, P.E. **Date:** 2/4/15

SPECIAL PERMIT CONDITIONS

1. This permit is issued to:
   MIAMI-DADE WATER AND SEWER DEPARTMENT
   P O BOX 330316
   MIAMI, FL 33233-0316

2. This permit shall expire on February 9, 2035.

3. Use classification is:

   Public Water Supply
   Aquifer Storage And Recovery

4. Source classification is:

   Groundwater from:
   Biscayne Aquifer
   Upper Floridan Aquifer

5. Allocation:

   Total annual allocation is 140,915.50 million gallons (MG). (386.07 MGD)

   Total maximum monthly allocation is 12,330.11 million gallons (MG).

   Allocation from a specific source (aquifer, waterbody, facility, or facility group):

   Maximum annual allocation from Upper Floridan Aquifer shall not exceed 13,348.05 million gallons (MG). (36.60 MGD).

   Maximum annual allocation from Biscayne Aquifer shall not exceed 127,567.50 million gallons (MG). (349.50 MGD).

   Maximum monthly allocation from Upper Floridan Aquifer shall not exceed 1,167.95 million gallons (MG).

   Maximum monthly allocation from Biscayne Aquifer shall not exceed 11,162.16 million gallons (MG).

   These allocations represent the amount of water required to meet the water demands as a result of a rainfall deficit during a drought with the probability of recurring one year in ten. The Permittee shall not exceed these allocations in hydrologic conditions less than a 1-in-10 year drought event. Compliance with the annual allocation is based on the quantity withdrawn over a 12-month time period. Compliance with the maximum

monthly allocation is based on the greatest quantity withdrawn in any single month. The annual allocation expressed in GPD or MGD is for informational purposes only.

If the rainfall deficit is more severe than that expected to recur once every ten years, the withdrawals shall not exceed that amount necessary to continue to meet the reasonable-beneficial demands under such conditions, provided no harm to the water resources occur and:

1. All other conditions of the permit are met; and

2. The withdrawal is otherwise consistent with applicable declared Water Shortage Orders in effect pursuant to Chapter 40E-21, F.A.C.

6. Withdrawal facilities:

Groundwater - Proposed:

1 - 24" X 50' X 2800 GPM Well Cased To 45 Feet
7 - 24" X 1200' X 2430 GPM Wells Cased To 1100 Feet
1 - 24" X 50' X 1400 GPM Well Cased To 45 Feet
3 - 24" X 72' X 1400 GPM Wells Cased To 45 Feet
8 - 17" X 1490' X 1400 GPM Wells Cased To 1080 Feet

Groundwater - Existing:

2 - 24" X 100' X 7500 GPM Wells Cased To 50 Feet
3 - 48" X 88' X 7500 GPM Wells Cased To 33 Feet
5 - 17" X 1490' X 1400 GPM Wells Cased To 1080 Feet
1 - 4" X 74' X 0 GPM Well Cased To 63.5 Feet
1 - 18" X 65' X 1500 GPM Well Cased To 50 Feet
20 - 14" X 115' X 2500 GPM Wells Cased To 80 Feet
4 - 24" X 100' X 4900 GPM Wells Cased To 35 Feet
10 - 48" X 80' X 10420 GPM Wells Cased To 46 Feet
1 - 12" X 40' X 800 GPM Well Cased To 35 Feet
1 - 42" X 68' X 10000 GPM Well Cased To 54 Feet
1 - 6" X 30' X 400 GPM Well Cased To 25 Feet
1 - 16" X 50' X 1600 GPM Well Cased To 40 Feet
1 - 30" X 115' X 4170 GPM Well Cased To 80 Feet
1 - 18" X 66' X 1500 GPM Well Cased To 53 Feet
1 - 14" X 115' X 3800 GPM Well Cased To 80 Feet
1 - 30" X 1250' X 3500 GPM Well Cased To 845 Feet
6 - 42" X 107' X 7000 GPM Wells Cased To 66 Feet
1 - 24" X 70' X 3470 GPM Well Cased To 35 Feet
7 - 16" X 100' X 4170 GPM Wells Cased To 40 Feet

SPECIAL PERMIT CONDITIONS

2 - 24" X 70' X 6945 GPM Wells Cased To 35 Feet
1 - 42" X 68' X 8500 GPM Well Cased To 60 Feet
1 - 17" X 1490' X 1400 GPM Well Cased To 1150 Feet
4 - 40" X 100' X 10420 GPM Wells Cased To 57 Feet
1 - 30" X 1210' X 3500 GPM Well Cased To 835 Feet
1 - 42" X 68' X 8500 GPM Well Cased To 54 Feet
1 - 18" X 55' X 1500 GPM Well Cased To 45 Feet
1 - 42" X 107' X 7000 GPM Well Cased To 69 Feet
4 - 24" X 108' X 8300 GPM Wells Cased To 50 Feet
2 - 12" X 40' X 1600 GPM Wells Cased To 35 Feet
4 - 24" X 104' X 6940 GPM Wells Cased To 54 Feet
1 - 12" X 35' X 1200 GPM Well Cased To 30 Feet
1 - 48" X 80' X 10416.67 GPM Well Cased To 46 Feet
1 - 12" X 35' X 800 GPM Well Cased To 30 Feet
1 - 30" X 115' X 2500 GPM Well Cased To 80 Feet
1 - 42" X 68' X 10000 GPM Well Cased To 60 Feet
1 - 18" X 55' X 1500 GPM Well Cased To 42 Feet
6 - 20" X 100' X 4900 GPM Wells Cased To 40 Feet
1 - 16" X 100' X 7500 GPM Well Cased To 40 Feet
1 - 18" X 50' X 500 GPM Well Cased To 40 Feet
1 - 30" X 1200' X 3500 GPM Well Cased To 765 Feet
1 - " X 60' X 0 GPM Well Cased To 55 Feet
1 - 30" X 1300' X 3500 GPM Well Cased To 850 Feet
1 - 30" X 1200' X 3500 GPM Well Cased To 760 Feet

7. The Permittee shall submit all data as required by the implementation schedule for each of the permit conditions to: SFWMD at www.sfwmd.gov/ePermitting, or Regulatory Support, MSC 9611, P.O. Box 24680, West Palm Beach, FL 33416-4680.

8. The Permittee must submit the appropriate application form incorporated by reference in Rule 40E-2.101, F.A.C., to the District prior to the permit expiration date in order to continue the use of water.

9. The Permittee shall secure a well construction permit prior to construction, repair, or abandonment of all wells, as described in Chapter 40E-3, F.A.C.

10. Permittees, who are dependent on other sources of water supply such as reclaimed water or water sale agreements to meet a portion of their demands, shall include the monthly volumes from all other sources in the report to the District, unless the use of those sources is reported to another state agency, in which case the District will obtain the water use information from said agency. The water accounting method and means of calibration shall be stated on each report.

SPECIAL PERMIT CONDITIONS

11. Prior to any withdrawals at the project, the Permittee shall provide the results of the calibration testing of the identified water accounting method(s) and equip all existing and proposed withdrawal facilities with approved water use accounting method(s) pursuant to Subsection 4.1.1 of the Applicant's Handbook for Water Use Permit Applications.

12. Every five years from the date of last calibration, the Permittee shall submit re-calibration data for each withdrawal facility.

13. Monthly withdrawals for each withdrawal facility shall be reported to the District semi-annually. The water accounting method and means of calibration shall be stated on each report.

14. The Permittee shall notify the District within 30 days of any change in service area boundary that results in a change in demand that affects its permitted allocation. The allocation shall be modified to effectuate such change.

15. If at any time there is an indication that the well casing, valves, or controls leak or have become inoperative, repairs or replacement shall be made to restore the system to an operating condition. Failure to make such repairs shall be cause for filling and abandoning the well, in accordance with procedures outlined in Chapter 40E-3, F.A.C.

16. The Permittee shall maintain an accurate flow meter at the intake of the water treatment plant for the purpose of measuring daily inflow of water.

    Permittee shall maintain a calibrated flow meter(s) at the intake (raw water) and discharge (treated water) points within the Hialeah/Preston, Alexander Orr, and proposed Hialeah RO and South Miami Heights water treatment plants for the purpose of measuring treatment losses and shall submit monthly data semi-annually as required pursuant to Special Condition 13.

17. The Standard Water Conservation Plan described in Subsection 2.3.2.F.1.a of the Applicant's Handbook for Water Use Permit Applications within the South Florida Water Management District and the Staff Report, must be implemented in accordance with the approved implementation schedule described in the following exhibit:

    The Water Conservation Plan is contained in Exhibit 18. The permittee shall submit an annual report covering water conservation activities during the prior calendar year by April 15 of each year describing water conservation activities for the year including expenditures, projects undertaken and estimated water savings.

18. The Permittee shall notify the District within 30 days of entering into an inter-local

agreement, contract, or other similar instrument to deliver or receive water outside of its service area or to serve a demand not identified to determine the allocation described in this permit. A copy of such agreement shall be provided to the District. The monthly volume of water delivered and/or received via each inter-local agreement, contract, or other similar instrument shall be submitted to the District at the same reporting frequency as the withdrawals for each withdrawal facility required in this permit.

19. The Permittee shall implement the wellfield operating plan submitted in support of the permit application, as described in the District staff report.
See Exhibit 10

20. The Permittee shall determine unaccounted-for distribution system losses. Losses shall be determined for the entire distribution system on a monthly basis. Permittee shall define the manner in which unaccounted-for losses are calculated. Reports shall be submitted to the District on a yearly basis and are due by April 30th of each year.

    In the event that the annual unaccounted-for distribution system losses, as defined by Section 2.3.2.F.2.c, of the Applicants Handbook for Water Use Permit Applications [AH], exceeds 10 percent, the permittee shall include in the annual report a description of additional actions which will be implemented the following year(s) to reduce the losses to less than ten percent.

21. Public water utilities that control, either directly or indirectly, a wastewater treatment plant, and which have determined pursuant to Section 403.064, F.S., that use of reclaimed water is feasible, must provide the District with annual updates of the following information: 1) the status of distribution system construction, including location and capacity of lines; 2) a summary of uncommitted supplies for the next year; 3) copies of any new or amended local mandatory reclaimed water reuse zone ordinances; and 4) a list of end-users who have contracted to receive reclaimed water and the agreed upon quantity of water to be delivered.

22. The Permittee shall maintain an accurate flow meter at the point of discharge from the treatment plant for the purpose of measuring the daily flow of water.

    Permittee shall maintain a calibrated flow meter(s) at the intake (raw water) and discharge (treated water) points within the Hialeah/Preston, Alexander Orr, and proposed Hialeah RO and South Miami Heights water treatment plants for the purpose of measuring treatment losses and shall submit monthly data semi-annually as required pursuant to Special Condition 13.

23. Pursuant to Section 373.236(4), F.S., every ten years from the date of permit issuance, the Permittee shall submit a water use compliance report for review and approval by District Staff to SFWMD at www.sfwmd.gov/ePermitting, or Regulatory Support, MSC

9611, P.O. Box 24680, West Palm Beach, FL 33416-4680.
(A) The results of a water conservation audit that documents the efficiency of water use on the project site using data produced from an onsite evaluation conducted. In the event that the audit Indicates additional water conservation is appropriate or the per capita use rate authorized in the permit is exceeded, the permittee shall propose and implement specific actions to reduce the water use to acceptable levels within timeframes proposed by the permittee and approved by the District.

(B) A comparison of the permitted allocation and the allocation that would apply to the project based on current District allocation rules and updated population and per capita use rates. In the event the permit allocation is greater than the allocation provided for under District rule, the permittee shall apply for a letter modification to reduce the allocation consistent with District rules and the updated population and per capita use rates to the extent they are considered by the District to be indicative of long term trends in the population and per capita use rates over the permit duration. In the event that the permit allocation is less than allowable under District rule, the permittee shall apply for a modification of the permit to increase the allocation if the permittee intends to utilize an additional allocation, or modify its operation to comply with the existing conditions of the permit.

3. Summary of the current and previous nine years progress reports for implementation of the Alternative Water Supply Plan and any modifications necessary to continue to meet the Plan requirements and conditions for issuance.

4. Information demonstrating that the conditions for issuance of the permit are being complied with, pursuant to Special Condition 45 and Section 373.236, F.S.

5. Updates or amendments to the County's reuse plan.

24. The Permittee shall provide annual status reports to the District that summarizes the Aquifer Storage and Recovery cycle testing activities. Reports shall be submitted to the District on a yearly basis and are due by April 30th of each year.

25. The Permittee shall submit to the District an updated "Summary of Groundwater (Well) Facilities" table ("Section IV - Sources of Water", Water Use Permit Application Form 1379) within 90 days of completion of the proposed wells identifying the actual total and cased depths, pump manufacturer and model numbers, pump types, intake depths and type of meters.

26. The permittee shall operate surface water control structure known as the Mid-canal structure and bridge in accordance with the approved operational plan included in Exhibit 22. In addition, whenever this structure is opened for the purpose of raising water in the Wellfield Protection Canal down stream of the structure, the upstream structure that delivers water from the L-30 canal shall be opened in a manner to

deliver equal volumes to those passed through the Mid-canal structure and bridge. The permittee shall submit operation and flow data logs regarding both structures to the District semi-annually.

27. The Permittee is authorized to exercise the emergency wells at the Medley Wellfield for a total of two hours per month as needed for bacterial clearance and pump maintenance. Operation of the emergency wells at the Medley Wellfield for more than this amount shall require prior approval from SFWMD. Pumpage data shall be collected and report in accordance with Special Condition 13.

28. No more than 15 MGD shall be withdrawn from the West Biscayne aquifer Wellfield on any given day.

29. No more than 25,550 MGY shall be withdrawn during any 12 month consecutive period from the combined Hialeah, Preston, Medley and Miami Springs Biscayne aquifer wellfields.

30. No more than 7,993 MGY shall be withdrawn during any 12 month consecutive period from the Snapper Creek Wellfield.

31. No more than 39,931 MGY shall be withdrawn during any 12 month consecutive period from the Southwest Biscayne aquifer Wellfield.

32. No more than 67,999 MGY shall be withdrawn during any 12 month consecutive period from the combined West, Southwest Snapper Creek and Alexander Orr Biscayne aquifer wellfields.

33. No more than 1,095 MGY shall be withdrawn during any 12 month consecutive period from the South Miami Heights Wellfield.

34. No more than 1,752 MGY shall be withdrawn during any 12 month consecutive period from the combined Everglades Labor Camp and Newton wellfields.

35. No more than 1,571 MGY shall be withdrawn during any 12 month consecutive period from the combined Elevated Tank, Leisure City and Naranja wellfields.

36. The Permittee shall continue to submit monitoring data in accordance with the approved water level monitoring program for this project. The existing monitoring program is described in Exhibits 30 and 32B.

37. The Permittee shall continue to submit monitoring data in accordance with the

approved saline water intrusion monitoring program for this project.
See exhibits 28A and 32B for a list of monitor wells and required sampling schedule.

The permittee shall submit annual Monitoring Program summary reports. The annual report will summarize the status of the project to update the salt front and install new monitor wells.

38. Within six months of permit issuance, an executed large user water agreement with the City of Hialeah shall be submitted to the District. In the event that the final agreement is for volumes less than those used in the formulation of the allocations in this permit, the allocations shall be reduced through a letter modification.

39. The permittee shall update the District on the status of reuse projects in Exhibit 14 on an annual basis.

40. The permittee will develop alternative water supplies in accordance with the schedules described in Exhibit 13.

The permittee will provide annual updates of the status of all alternative water supply projects (per the timeframes contained in Special Condition 44). The status report shall include work completed to date, expenditures and any anticipated changes in the timelines.

41. In the event that a milestone specified in the alternative water supply schedule and plan contained in Exhibit 13 is going to be missed, the permittee shall notify the Executive Director of the District in writing explaining the nature of the delay, actions taken to bring the project back on schedule and an assessment of the impact the delay would have on the rates of withdrawals from the Everglades water bodies and associated canals as defined in SFWMD consumptive use permitting rules. The District will evaluate the situation and take actions as appropriate which could include: a.) granting an extension of time to complete the project (if the delay is minor and doesn't affect the Everglades Waterbodies or otherwise violates permit conditions), b.) take enforcement actions including consent orders and penalties, c.) modify allocations contained in this permit from the Biscayne aquifer including capping withdrawal rates until the alternative water supply project(s) are completed (in cases where the delay would result in violations of permit conditions) or d.) working with the Department of Community Affairs to limit increase demands for water until the alternative water supply project is completed.

42. For rehydration of Biscayne Coastal Wetlands, in consultation with the District, the FDEP and Biscayne Bay National Park, upon completion of the pilot testing program, the parties shall agree on the water quality treatment required and the feasibility, as

defined in Section 2.2.4 of the Applicants Handbook for Water Use Permit Applications, of this project on or before April 15, 2015. Extension of this deadline may be issued in writing by the District upon demonstration of good cause such as events beyond the control of the permittee or after consideration of the results/data collected, the District determines that additional testing is necessary. In determining the water quality needed, the parties will consider State and Federal water quality discharge standards, the volume and timing of water to be delivered to Biscayne Bay and the location of delivery. In the event the parties do not reach agreement on the feasibility by April 15, 2015, the Permittee shall begin development of an alternate reuse project from the South District wastewater facility and shall provide the District with a proposal for an alternate project including a conceptual design and schedule for implementation on or before March 15, 2016.

43. The permittee may request temporary authorization from the District to capture and store stormwater via withdrawals from the permitted Biscayne aquifer production wells, for storage within the Floridan aquifer system consistent with their FDEP issued Underground Injection Control permits.The District will consider the availability of stormwater that is not otherwise needed for environmental protection or enhancement and is in no way bound to authorize such requests. All such requests shall be made in writing to the Director of Water Use Regulation.

44. All annual reports required in these Special Conditions shall address activities that occurred during a calendar year and shall be submitted to Water Use Compliance on or before April 15th of the following year.

45. If it is determined that the conditions for permit issuance are no longer met for the 20 year permit duration, the permittee shall obtain a modification of the Permit from the District as necessary to come into compliance with the conditions for permit issuance. Such conditions for permit issuance include minimum flows and levels, water reservations, and other conditions ensuring the use does not cause water resource harm and is consistent with the objectives of the District, including implementation of the Comprehensive Everglades Restoration Plan.

46. The permittee shall operate the West Wellfield in accordance with the Memorandum of Understanding between the U.S. Department of the Interior, the Governor of the State of Florida, Miami Dade County and the District incorporated in Exhibit 35.

STANDARD PERMIT CONDITIONS

1. All water uses authorized by this permit shall be implemented as conditioned by this permit, including any documents incorporated by reference in a permit condition. The District may revoke this permit, in whole or in part, or take enforcement action, pursuant to Section 373.136 or 373.243, F.S., unless a permit modification has been obtained to address the noncompliance.

   The Permittee shall immediately notify the District in writing of any previously submitted material information that is later discovered to be inaccurate.

2. The Permittee is advised that this permit does not relieve any person from the requirement to obtain all necessary federal, state, local and special district authorizations.

3. The Permittee shall notify the District in writing within 30 days of any sale, transfer, or conveyance of ownership or any other loss of permitted legal control of the Project and/or related facilities from which the permitted consumptive use is made. Where Permittee's control of the land subject to the permit was demonstrated through a lease, the Permittee must either submit a new or modified lease showing that it continues to have legal control or documentation showing a transfer in control of the permitted system/project to the new landowner or new lessee. All transfers of ownership are subject to the requirements of Rule 40E-1.6107, F.A.C. Alternatively, the Permittee may surrender the consumptive use permit to the District, thereby relinquishing the right to conduct any activities under the permit.

4. Nothing in this permit should be construed to limit the authority of the District to declare a water shortage and issue orders pursuant to Chapter 373, F.S. In the event of a declared water shortage, the Permittee must adhere to the water shortage restrictions, as specified by the District. The Permittee is advised that during a water shortage, reports shall be submitted as required by District rule or order. The Permittee is advised that during a water shortage, pumpage, water levels, and water quality data shall be collected and submitted as required by District orders issued pursuant to Chapter 40E-21, F.A.C.

5. This permit does not convey to the Permittee any property rights or privileges other than those specified herein, nor relieve the permittee from complying with any applicable local government, state, or federal law, rule, or ordinance.

6. With advance notice to the Permittee, District staff with proper identification shall have permission to enter, inspect, observe, collect samples, and take measurements of permitted facilities to determine compliance with the permit conditions and permitted plans and specifications. The Permittee shall either accompany District staff onto the property or make provision for access onto the property.

7. A. The Permittee may seek modification of any term of an unexpired permit. The Permittee is advised that Section 373.239, F.S., and Rule 40E-2.331, F.A.C., are applicable to permit modifications.

   B. The Permittee shall notify the District in writing 30 days prior to any changes to the project that could potentially alter the reasonable demand reflected in the permitted allocation. Such changes include, but are not limited to, change in irrigated acreage, crop type, irrigation system, large users agreements, or water treatment method. Permittee will be required to apply for a modification of the permit for any changes in permitted allocation.

8. If any condition of the permit is violated, the permit shall be subject to review and modification, enforcement action, or revocation pursuant to Chapter 373, F.S.

9. The Permittee shall mitigate interference with existing legal uses that was caused in whole or in part by the Permittee's withdrawals, consistent with the approved mitigation plan. As necessary to offset the interference, mitigation will include pumpage reduction, replacement of the impacted individual's equipment, relocation of wells, change in withdrawal source, or other means.

   Interference to an existing legal use is defined as an impact that occurs under hydrologic conditions equal to or less severe than a 1-in-10 year drought event that results in the:

   A. Inability to withdraw water consistent with provisions of the permit, such as when remedial structural or operational actions not materially authorized by existing permits must be taken to address the interference; or

   B. Change in the quality of water pursuant to primary State Drinking Water Standards to the extent that the water can no longer be used for its authorized purpose, or such change is imminent.

10. The Permittee shall mitigate harm to the natural resources caused by the Permittee's withdrawals, as determined through reference to the conditions for permit issuance. When harm occurs, or is imminent, the District will require the Permittee to modify withdrawal rates or mitigate the harm. Harm, as determined through reference to the conditions for permit issuance includes:

    A. Reduction in ground or surface water levels that results in harmful lateral movement of the fresh water/salt water interface,

    B. Reduction in water levels that harm the hydroperiod of wetlands,

    C. Significant reduction in water levels or hydroperiod in a naturally occurring water body such as a lake or pond,

D. Harmful movement of contaminants in violation of state water quality standards, or

E. Harm to the natural system including damage to habitat for rare or endangered species.

11. The Permittee shall mitigate harm to existing off-site land uses caused by the Permittee's withdrawals, as determined through reference to the conditions for permit issuance. When harm occurs, or is imminent, the District will require the Permittee to modify withdrawal rates or mitigate the harm. Harm as determined through reference to the conditions for permit issuance, includes:

    A. Significant reduction in water levels on the property to the extent that the designed function of the water body and related surface water management improvements are damaged, not including aesthetic values. The designed function of a water body is identified in the original permit or other governmental authorization issued for the construction of the water body. In cases where a permit was not required, the designed function shall be determined based on the purpose for the original construction of the water body (e.g. fill for construction, mining, drainage canal, etc.)

    B. Damage to agriculture, including damage resulting from reduction in soil moisture resulting from consumptive use; or,

    C. Land collapse or subsidence caused by reduction in water levels associated with consumptive use.

APPENDIX C

MIAMI-DADE COUNTY WATER AND SEWER DEPARTMENT ADOPTED FY 2014-2020 CAPITAL BUDGET AND MULTI-YEAR CAPITAL PLAN – SEPTEMBER 18, 2014

MIAMI-DADE COUNTY

Delivering Excellence Every Day

MIAMI-DADE WATER AND SEWER DEPARTMENT

ADOPTED FY 2014-2020 CAPITAL BUDGET AND MULTI-YEAR CAPITAL PLAN

SEPTEMBER 18, 2014

Prepared by Capital Planning and Coordination Section

MIAMI-DADE WATER AND SEWER DEPARTMENT
2014-2020 CAPITAL BUDGET AND MULTI-YEAR CAPITAL PLAN
Projection by Project Sub-project by Year - Water
As of: 9/30/2013

Version 4

Proj	Sub-Proj	Sub-Proj Description	Current Bond/Fund Allocation	Expenditures As of 9/30/2013	Remaining Bond/Fund Allocation	PROJECTIONS 2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
1075	101546	WATER TREATMENT MODIFICATIONS TO COMPLY WITH SURFACE WATER TREATMENT AND DISINFECTANT/DISINFECTION BY PRODUCT REGULATIONS	532,824,088	13,200,885	519,623,203	300,000	1,000,000	7,500,000	20,000,000	176,682,053	160,710,573	133,430,577	0	0	0	0	519,623,203
	101891	NEW NWWF HIGH SERVICE PUMP STATION	43,250,000	0	43,250,000	0	0	1,500,000	10,000,000	15,000,000	14,500,000	2,250,000	0	0	0	0	43,250,000
		TOTAL - 1075	585,954,088	13,200,885	572,753,203	300,000	1,300,000	12,200,000	33,300,000	194,762,053	195,210,573	135,680,577	0	0	0	0	572,753,203
1077	101364	SOUTH MIAMI HEIGHTS WTP AND WF - NEW WATER TREATMENT PLANT	75,456,139	5,389,891	70,066,248	200,000	1,500,000	20,000,000	26,913,097	5,727,131	15,726,020	0	0	0	0	0	70,066,248
	101365	SOUTH MIAMI HEIGHTS WTP AND WF - NEW WELLFIELD	20,878,062	2,836,758	18,041,304	100,000	1,500,000	7,500,000	8,941,305	0	0	0	0	0	0	0	18,041,305
	101575	CONSTRUCTION MANAGEMENT AT SOUTH MIAMI HEIGHTS WTP	4,700,000	1,993,567	2,706,433	123,356	500,000	1,460,764	622,313	0	0	0	0	0	0	0	2,706,433
	101778	DESIGN AND CONSTRUCTION OF PROPOSED 16 INCH WATER MAIN	4,500,000	1,477,596	3,022,404	144,249	1,400,000	1,478,155	0	0	0	0	0	0	0	0	3,022,404
	102020	SOUTH MIAMI HEIGHTS FA MEMBRANES WTP	42,000,000	0	42,000,000	0	0	0	0	0	0	0	42,000,000	0	0	0	42,000,000
	102021	SOUTH MIAMI HEIGHTS - FA WELLS AND PIPING	21,600,000	0	21,600,000	0	0	0	0	0	0	0	21,600,000	0	0	0	21,600,000
		TOTAL - 1077	169,134,201	11,697,812	157,436,389	567,605	4,900,000	30,438,919	36,476,715	5,727,131	15,726,020	0	63,600,000	0	0	0	157,436,390
1078	101368	TELEMETERING SYSTEM - WATER	17,297,263	2,650,110	14,647,153	2,214,885	1,133,067	2,433,067	2,433,067	2,433,067	2,000,000	2,000,000	0	0	0	0	14,647,153

MIAMI-DADE WATER AND SEWER DEPARTMENT
2014-2020 CAPITAL BUDGET AND MULTI-YEAR CAPITAL PLAN

Projection by Project Sub-project by Year - Water

As of: 9/30/2013

Version 4

Proj	Sub-Proj	Sub-Proj Description	Current Bond/Fund Allocation	Expenditures As of 9/30/2013	Remaining Bond/Fund Allocation	PROJECTIONS 2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
		TOTAL - 1078	17,297,263	2,650,110	14,647,153	2,214,885	1,133,067	2,433,067	2,433,067	2,433,067	2,000,000	2,000,000	0	0	0	0	14,647,153
1080	101679	HIALEAH FLORIDAN AQUIFER R.O. W.T.P. PHASE 1 (10 MGD) - GOB IN 1065.101956	45,608,637	44,756,907	851,730	851,730	0	0	0	0	0	0	0	0	0	0	851,730
	101737	HIALEAH FLORIDAN AQUIFER R.O. W.T.P. PHASE 2 (5 MGD)	12,816,075	0	12,816,075	0	0	0	0	0	0	0	12,816,075	0	0	0	12,816,075
	101738	HIALEAH FLORIDAN AQUIFER R.O. W.T.P. PHASE 3 (2.5 MGD)	6,099,000	0	6,099,000	0	0	0	0	0	0	0	6,099,000	0	0	0	6,099,000
		TOTAL - 1080	64,523,712	44,756,907	19,766,805	851,730	0	0	0	0	0	0	18,915,075	0	0	0	19,766,805
1081	101966	INSTALLATION OF 12-INCH DIWM ON EAST DRIVE FROM NW 36 ST. TO LABARON DR.	687,042	602,944	84,098	50,000	34,098	0	0	0	0	0	0	0	0	0	84,098
		TOTAL - 1081	687,042	602,944	84,098	50,000	34,098	0	0	0	0	0	0	0	0	0	84,098
1082	101969	WATER - PIPES AND INFRASTRUCTURE PROJECTS	83,608,444	29,122,567	54,485,877	10,775,476	8,000,000	14,906,409	6,201,688	5,547,738	4,874,170	4,180,396	0	0	0	0	54,485,877
		TOTAL - 1082	83,608,444	29,122,567	54,485,877	10,775,476	8,000,000	14,906,409	6,201,688	5,547,738	4,874,170	4,180,396	0	0	0	0	54,485,877
		TOTAL - Water	4,067,616,612	410,768,117	3,656,848,495	83,880,760	119,010,688	214,146,080	255,797,526	418,171,885	403,102,053	305,885,696	1,852,270,268	2,583,540	2,000,000	0	3,656,848,496

APPENDIX D

MIAMI DADE COUNTY ORDINANCE No. 08-14
WATER USE EFFICIENCY STANDARDS

Memorandum

Date: February 29, 2008

To: Sergio Purrinos, City Manager

From: Nathan M. Kogon, Planning and Zoning Director

Subject: Miami-Dade County - Ordinance 08-14

Attached please find Miami-Dade County Ordinance 08-14; relating to water use efficiency standards. Ordinance 08-14 amends the Florida Building Code for new residential and commercial developments; revising and providing for maximum flow rates and consumption for plumbing fixtures, fixture fittings and appliances.

MEMORANDUM

Agenda Item No. 7(A)

TO:	Honorable Chairman Bruno A. Barreiro and Members, Board of County Commissioners	**DATE:**	February 5, 2008
FROM:	R. A. Cuevas, Jr. County Attorney	**SUBJECT:**	Ordinance relating to water use efficiency standards

The accompanying ordinance was prepared and placed on the agenda at the request of Commissioner Natacha Seijas.

R. A. Cuevas, Jr.
County Attorney

RAC/bw

Memorandum

MIAMI-DADE COUNTY

Date: February 5, 2008

To: Honorable Chairman Bruno A. Barreiro
and Members, Board of County Commissioners

From: George M. Burgess
County Manager

Subject: Ordinance relating to water use efficiency standards

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The ordinance relating to water use efficiency standards will not have a fiscal impact to Miami-Dade County. The development of the Water Use Efficiency Manual, reviews of Development of Regional Impact (DRI) projects and the public information and outreach activities required in the ordinance will be performed using existing resources.

There will not be an impact to the public except for High Efficiency Appliances, which currently have a higher initial cost. In addition, there will be a fiscal impact to a developer if a DRI project is required to install an alternative water supply, however; the impact will depend on the size and scope of the project.

Susanne M. Torriente
Assistant County Manager

fle00808

MEMORANDUM

(Revised)

TO: Honorable Chairman Bruno A. Barreiro and Members, Board of County Commissioners

DATE: February 5, 2008

FROM: R. A. Cuevas, Jr. County Attorney

SUBJECT: Agenda Item No. 7(A)

Please note any items checked.

_____ "4-Day Rule" ("3-Day Rule" for committees) applicable if raised

_____ 6 weeks required between first reading and public hearing

_____ 4 weeks notification to municipal officials required prior to public hearing

_____ Decreases revenues or increases expenditures without balancing budget

_____ Budget required

_____ Statement of fiscal impact required

_____ Bid waiver requiring County Manager's written recommendation

_____ Ordinance creating a new board requires detailed County Manager's report for public hearing

_____ Housekeeping item (no policy decision required)

_____ No committee review

Approved _____ Mayor
Veto _____
Override _____

Agenda Item No. 7(A)
2-5-08

ORDINANCE NO. _____

ORDINANCE RELATING TO WATER USE EFFICIENCY STANDARDS; CREATING SECTION 8-31 OF THE CODE OF MIAMI-DADE COUNTY, FLORIDA; ADOPTING LOCAL TECHNICAL AMENDMENTS TO FLORIDA BUILDING CODE FOR NEW RESIDENTIAL AND COMMERCIAL DEVELOPMENTS; REVISING AND PROVIDING FOR MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES, FIXTURE FITTINGS AND APPLIANCES; CREATING SECTIONS 32-84, 32-85 AND 32-86 OF THE CODE OF MIAMI-DADE COUNTY, FLORIDA; PROVIDING FOR PUBLICATION OF WATER USE EFFICIENCY STANDARDS MANUAL FOR NEW RESIDENTIAL AND COMMERCIAL DEVELOPMENTS; PROVIDING FOR EVALUATION OF ALTERNATIVE WATER SUPPLY PROJECTS FOR NEW DEVELOPMENTS OF REGIONAL IMPACT; PROVIDING FOR WATER USE EFFICIENCY AND CONSERVATION EDUCATION AND OUTREACH; AMENDING SECTION 8A-381 OF THE CODE OF MIAMI-DADE COUNTY, FLORIDA TO REQUIRE SUBMETERS IN MULTI-FAMILY RESIDENTIAL DEVELOPMENTS; PROVIDING SEVERABILITY, INCLUSION IN THE CODE AND AN EFFECTIVE DATE

WHEREAS, Miami-Dade County's main source of drinking water is the Biscayne Aquifer which also serves two national parks, the Everglades and Biscayne National Park, agricultural interests, industrial and other users; and

WHEREAS, the Miami-Dade Water and Sewer Department ("Department") supplies potable water to over 400,000 retail customers and provides wholesale water service to 15 municipalities; and

WHEREAS, approximately 348 million gallons per day is withdrawn from the Biscayne Aquifer by the Department for public water supply; and

WHEREAS, Miami-Dade County is located within the Lower East Coast planning area of the South Florida Water Management District ("District"); and

WHEREAS, the District has adopted a new Regional Water Availability Rule that includes the Lower East Coast as a geographic area with restrictions on the utilization of specific water supply sources; and

WHEREAS, the Department has applied to the District for a 20-year Consumptive Use Permit; and

WHEREAS, the County is required to develop alternative water sources to meet increased demands over the next 20 years; and

WHEREAS, the County is making significant financial investments in capital improvement projects to provide adequate water supply for projected water demands by the use of alternative water supplies such as reclaimed water and brackish water from the Floridan Aquifer; and

WHEREAS, this Board finds that the efficient use and conservation of water reflect responsible use of a limited and precious resource that is essential to life, and will prevent and reduce wasteful, uneconomical, impractical, or unreasonable use of water resources; and

WHEREAS, in 2006, this Board approved the Miami-Dade County Water Use Efficiency Five-Year Plan ("Water Use Efficiency Plan") which is goal-based, accountable and measures water conservation efforts; and

WHEREAS, in 2007, the District approved the Water Use Efficiency Plan for 20 years to coincide with the County's proposed 20-year Consumptive Use Permit; and

WHEREAS, a stakeholder Advisory Committee appointed by the Director of the Water and Sewer Department provided this Board with recommendations to achieve maximum water use savings for all new development in Miami-Dade County; and

WHEREAS, in accordance with R-884-06, Miami-Dade County is a partner with the Environmental Protection Agency WaterSense Program for the promotion and implementation of water use saving technologies through its Water-Use Efficiency Plan; and

WHEREAS, Miami-Dade County is an active participant in the Florida Department of Environmental Protection Conserve Florida Water Program for the development of statewide guidelines for water use efficiency; and

WHEREAS, this Board finds that significant amounts of water can be saved through the installation of efficient water fixtures, appliances and other water saving measures and equipment; and

WHEREAS, such water use efficiency measures in new developments will help ensure that the County meets its water conservation goals provided in the Water Use Efficiency Plan for the duration of the County's 20-year water use permit; and

WHEREAS, the Florida Building Code, as amended by local technical amendments pursuant to Section 553.73(4)(b), Florida Statutes, is the uniform building code for Miami-Dade County; and

WHEREAS, based on the local conditions of water resources and the projected demand for water in Miami-Dade County, this Board finds that there is a local need to strengthen the requirements of the Florida Building Code for Miami-Dade County to meet the water conservation

goals provided in the Water Use Efficiency Plan and to ensure the availability of potable water to meet the County's projected demand for water and protect the public's health, safety and welfare; and

WHEREAS, the proposed local technical amendments to the Florida Building Code addresses the County's needs,

NOW, THEREFORE, BE IT ORDAINED BY THE BOARD OF COUNTY COMMISSIONERS OF MIAMI-DADE COUNTY, FLORIDA:

Section 1. Section 8-31 of the Code of Miami-Dade County is hereby created to read as follows: [1]

>>**Sec. 8-31. Local Technical Amendments to Florida Building Code**

(A) The County hereby adopts the following local technical amendments to Chapter 6 (Plumbing) of the Florida Building Code.

604.4 Maximum flow and water consumption.

The maximum water consumption flow rates and quantities for all plumbing fixtures, fixture fittings and appliances shall be in accordance with Table 604.4. Effective July 1, 2008, permit applications for new residential and commercial structures shall include high efficiency plumbing fixtures, fixture fittings and appliances as provided in Table 604.4. Such high efficiency plumbing fixtures, fixture fittings and appliances shall comply with the specifications of U.S. Environmental Protection Agency (EPA) WaterSense Program or the Uniform North American Requirements (UNAR) Guidelines and Specifications.

Exceptions:

1. Blowout design water closets [3.5 gallons (13L) per flushing cycle].
2. Vegetable sprays.

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1 Words Stricken through and/or [[double bracketed]] shall be deleted. Words underscored and/or >>double arrowed<< constitute the amendment proposed. Remaining provisions are now in effect and remain unchanged.

3. Clinical sinks [4.5 gallons (17 L) per flushing cycle].
4. Service sinks.
5. Emergency showers.<<

TABLE 604.4

MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES>>,<< [[~~AND~~]] FIXTURE FITTINGS >>AND APPLIANCES<<

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE [[~~OR QUANTIFY~~]] [b]
Lavatory, private	[[~~2.2~~]] >>1.0<< gpm at 60 psi
Lavatory, public, (metering)	0.25 gallon per metering cycle
Lavatory, public (other than metering)	0.5 gpm at 60 psi
Shower head [a]	[[~~2.5~~]] >> 1.5<< gpm at 80 psi
Sink faucet	[[~~2.2~~]] >> 1.0<< gpm at 60 psi
Urinal	>>Waterless or 0.5<< gallon per flushing cycle
Water closet	[[~~1.6~~]] >>1.28<< gallons per flushing cycle
>>Dishwasher (residential)<<	>>6.5 gallons per cycle or less (Energy Star/Water Sense Certified) [c]<<
>>Dishwasher (commercial)<<	>>less than 1.2 gallons per rack for fill and dump machines and less than 0.9 gallons per rack for all other types of machines<<
>>Under the counter machines<<	>>1.0 gallon or less per rack for high-temperature machines and 1.7 gallons per rack for low-temperature machines<<
>>Washing machine<<	>>Water factor of 8 or lower (Energy Star/Water Sense Certified) [c]<<

For SI: 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m
1 pound per square inch = 6.895 kPa.
a. A hand-held shower spray is a shower head.
b. Consumption tolerances shall be determined from referenced standards.
>>c. Water factor in gallons per cycle per cubic foot<<

>>(B) The County hereby adopts the following local technical amendments to Chapter 29 (Residential) of the Florida Building Code.

P2903.2 Maximum flow and water consumption.

The maximum water consumption flow rates and quantities for all plumbing fixtures, fixture fittings and appliances shall be in accordance with Table P2903.2a. Effective July 1, 2008, permit applications for new residential structures shall include high efficiency plumbing fixtures, fixture fittings and appliances as provided in Table P2903.2a. Such high efficiency plumbing fixtures, fixture fittings and appliances shall comply with the specifications of U.S. Environmental Protection Agency (EPA) WaterSense Program or the Uniform North American Requirements (UNAR) Guidelines and Specifications.<<

TABLE P2903.2a
MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES>>,<< [[~~AND~~]] FIXTURE FITTINGS AND >>APPLIANCES<<

PLUMBING FIXTURE OR FIXTURE FITTING	PLUMBING FIXTURE OR FIXTURE FITTING >>MAXIMUM FLOW RATE [b]<<
Lavatory faucet	[[~~2.2~~]] >>1.0<< gpm at 60 psi
Shower head [a]	[[~~2.5~~]]>>1.5<<gpm at 80 psi
Sink faucet	[[~~2.2~~]]>>1.0<< gpm at 60 psi
Water closet	[[~~1.6~~]]>>1.28<< gallons per flushing cycle
>>Dishwasher (residential)<<	>>6.5 gallons per cycle or less (Energy Star/Water Sense Certified) [c]<<
>>Washing Machine<<	>>Water factor of 8 or lower (Energy Star/Water Sense Certified) [c]<<

For SI: 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m
1 pound per square inch = 6.895 kPa.
a. A handheld shower spray is a showerhead.
b. Consumption tolerances shall be determined from referenced standards.
>>c. Water factor in gallons per cycle per cubic foot<<

Section 2. Section 32-84 of the Code of Miami-Dade County, Florida is hereby created to read as follows:

>>**Sec. 32-84. Water use efficiency standards manual**

The Miami-Dade Water and Sewer Department ("MDWASD"), in consultation with the Planning Department and such other applicable county departments and agencies, shall publish a water use efficiency standards manual to achieve maximum water savings in new residential and commercial developments in the incorporated and unincorporated areas of Miami-Dade County. The manual shall be initially published on July 1, 2008 and shall be updated annually on July 1 following approval by the County Commission. Each applicant for water service to a new residential or commercial development in incorporated and unincorporated areas of Miami-Dade County shall include in its application every water use efficiency standard that will be incorporated into the new development. The County or applicable municipality shall review the application for compliance with the manual. In evaluating the application for compliance, the County or applicable municipality will consider the availability of products required to implement the water use efficiency standards. The developer's agreement for water service shall include the water use efficiency standards approved by the County.<<

Section 3. Section 32-85 of the Code of Miami-Dade County is hereby created to read as follows:

>>**Sec. 32-85. Alternative water supply for developments of regional impact.**

Applications for new Developments of Regional Impact ("DRI") with a projected water demand of one million gallons per day or greater shall be evaluated by MDWASD to determine the feasibility of an alternative water supply project. Such projects may include the installation of a reverse osmosis plant, wastewater reclamation facility and reuse distribution system.<<

Section 4. Section 32-86 of the Code of Miami-Dade County is hereby created to read as follows:

>>**Sec. 32-86. Water use efficiency and conservation education and outreach.**

The Miami-Dade County Water Use Efficiency Manager shall provide public information, education and outreach on all water use efficiency standards and water conservation programs.<<

Section 5. Section 8A-381 of the County of Miami-Dade County, Florida is hereby amended to read as follows:

Sec. 8A-381. Intent and application.

* * *

(c) The provisions of this article shall apply to multiple unit properties utilizing water services. >>Effective July 1, 2008, all permit applications for new multi-family residential developments shall be required to include a submeter for each individual dwelling unit.<<

Section 6. If any section, subsection, sentence, clause or provision of this ordinance is held invalid, the remainder of this ordinance shall not be affected by such invalidity.

Section 7. It is the intention of the Board of County Commissioners, and it is hereby ordained that the provisions of this ordinance, including any Sunset provision, shall become and be made a part of the Code of Miami-Dade County, Florida. The sections of this ordinance may be renumbered or relettered to accomplish such intention and the word "ordinance" may be changed to "section", "article" or other appropriate word.

Section 8. This ordinance shall become effective on July 1, 2008 unless vetoed by the Mayor within ten (10) days of enactment, and if vetoed, shall become effective only upon an override by this Board.

PASSED AND ADOPTED:

Approved by County Attorney as to form and legal sufficiency.

Prepared by:

Henry N. Gillman

Sponsored by Commissioner Natacha Seijas

APPENDIX E

MIAMI DADE WATER AND SEWER DEPARTMENT
PROPOSED REUSE PROJECTS

Reuse Projects

Project	Reclaimed water generated from and amount to be treated	Quantity of Reclaimed Wastewater Applied	Reclaimed water used for	Anticipated Completion
1.	North District WWTP (Permitted) 4.44 MGD	4.44 MGD	2.94 MGD Industrial & 1.5 MGD Public Access	Existing
2.	Central District WWTP (Previous Permitted Limit) 7.84 MGD	7.84 MGD	Industrial Use Only	Existing
3.	South District WWTP (Previous Permitted Limit) 4.17 MGD	4.17 MGD	Industrial & Non-Public Access Irrigation	Existing
	TOTAL EXISTING PROJECTS (PERMITTED) = 16.49 MGD			
4.	South District WWTP 9.2 MGD	9.2 MGD	Floridan aquifer recharge. The scope of these projects is part of the Ocean Outfall legislation implementation plan submitted to the Secretary of FDEP on June 28, 2013.	Dec 31, 2025
5.	Central District WWTP 9.2 MGD	9.2 MGD		Dec 31, 2025
6.	West District Water Reclamation Plant 9.2 MGD	9.2 MGD		Dec 31, 2025
7.	South District WWTP 90 MGD	90 MGD	TPoint Units 5 & 6 cooling TP Unit 7 cooling	Dec 31, 2022 Dec 31, 2023
	TOTAL NEW PROJECTS = 117.5 MGD			Dec 31, 2025

EXHIBIT 14
August 2014

APPENDIX F

CITY OF DORAL
ORDINANCE No. 2007-13

ORDINANCE #2007- 13

AN ORDINANCE OF THE MAYOR AND CITY COUNCIL OF THE CITY OF DORAL, FLORIDA, CREATING AND ADOPTING A CODE SECTION ENTITLED "WATER RESTRICTIONS"; PROVIDING FOR INTENT AND PURPOSE; PROVIDING FOR DEFINITIONS; PROVIDING FOR APPLICABILITY; PROVIDING FOR AMENDMENTS TO WATER SHORTAGE PLAN; PROVIDING FOR DECLARATION OF WATER SHORTAGE; PROVIDING FOR ENFORCEMENT AND PENALTIES; PROVIDING FOR WATER USERS ACCEPTANCE; PROVIDING FOR CONFLICTS; PROVIDING FOR INCLUSION; PROVIDING FOR SEVERABILITY AND PROVIDING FOR AN EFFECTIVE DATE.

WHEREAS, the City of Doral is concerned about the water resources for the its residents and business owners; and

WHEREAS, the City of Doral believes that it is necessary to regulate the water usage during the time of a declared water shortage; and

WHEREAS, the City of Doral wishes to assist the South Florida Water Management District in the implementation of its water shortage plan; and

WHEREAS, the Mayor and City Council through the adoption of this ordinance seeks to protect the water resources of the City of Doral from harmful effects of over utilization during periods of water shortage;

NOW, THEREFORE, BE IT ORDAINED BY THE MAYOR AND COUNCIL OF THE CITY OF DORAL:

Section 1. The foregoing "WHEREAS" clauses are hereby ratified and confirm as being true and correct and hereby made a specific part of this Ordinance upon adoption hereof.

Section 2. That a new ordinance of the City of Doral, entitled, "Water Shortages," shall be and it is hereby created to read as follows:

ARTICLE I. WATER SHORTAGES

Sec. 1-101. Intent and purposes.

It is the intent and purpose of this article to protect the water resources of City of Doral from the harmful effects of over-utilization during periods of water shortage and allocate available water supplies by assisting the South Florida Water Management District in the implementation of its water shortage plan.

Sec. 1-102. Definitions.

For the purpose of this article the following terms, phrases, words and their derivatives shall have the meaning given herein, when not inconsistent with the context, words used in the present tense include the future, words in the plural include the singular, and words in the singular include the plural. The word "shall" is always mandatory and not merely directory.

District is the South Florida Management District.

Person is any person, firm, partnership, association, corporation, company or organization of any kind.

Water resource means any and all water on or beneath the surface of the ground, including natural or artificial watercourses, lakes, ponds, or diffused surface water, and water percolating, standing, or flowing beneath the surface of the ground.

Water shortage condition is when sufficient water is not available to meet present or anticipated needs of persons using the water resource, or when conditions are such as to require temporary reduction in total water usage within a particular area to protect the water resource from serious harm. A water shortage usually occurs due to drought.

Water shortage emergency means that situation when the powers which can be exercised under part II of Chapter 40E-21, Florida Administrative Code, are not sufficient to protect the public health, safety or welfare, or the health of animals, fish or aquatic life, or a public water supply, or commercial, industrial, agricultural, recreational or other reasonable uses.

Sec. 1-103. Application of article.

The provisions of this article shall apply to all persons using the water resource within the geographical areas subject to the "water shortage" or "water shortage emergency," as determined by the district, whether from public or privately owned water utility system, private wells, or private connections with surface water bodies. This article shall not apply to persons using treated effluent or saltwater.

Sec. 1-104. Amendments to water shortage plan.

Chapter 40E-21, Florida Administrative Code, as same may be amended from time to time, is incorporated herein by reference as a part of the City of Doral Code.

Sec. 1-105. Declaration of water shortage; water shortage emergency.

The declaration of a water shortage or water shortage emergency within all or any part of the City of Doral by the South Florida Water Management District shall invoke the provisions of this article. Upon such declaration all water use restrictions or other measures adopted by the district applicable to City of Doral, or any portion thereof, shall be subject to enforcement action pursuant to this article. Any violation of the provisions of Chapter 40E-21, Florida Administrative Code or any other issued pursuant thereto shall be a violation of this article.

Sec. 1-106. Enforcement.

This article shall be enforced by the Code Compliance Department and the Doral Police Department. If a Code Compliance Officer finds a violation of this article, he shall issue a civil citation to the violator as provided in the Code Compliance Ordinance. The citation shall inform the violator of the nature of the violation, amount of fine for which the violator may be liable, instructions and due date for paying the fine, notice that the violation may be appealed by requesting an administrative hearing within 20 days after service of the violation, and that failure to do so shall constitute an admission of the violations and waiver of the right to a hearing. Each day in violation of this article shall constitute a separate offense. The City of Doral, in addition to the criminal sanctions contained herein, may take any other appropriate legal action, including but not limited to emergency injunctive action, to enforce the provisions of this article.

Sec. 1-107. Penalties.

Violation of any provisions of this article shall be subject to the following penalties:
TABLE INSET:

Phase I – Water Restrictions	Warning Notices
Phase II or Phase III First violation	Citation in the amount of $50.00
Second violation	Citation in the amount of $250.00
Third Violation	Citation in the amount $500.00
Fourth and any subsequent violations	Fine not to exceed $500.00 and /or imprisonment in the county jail not to exceed 60 days.

1) A violator who has been served with a citation shall elect either to:
a. Pay the citation in the manner indicated on the notice; or
b. Request an administrative hearing before a Special Magistrate appointed by the City Council upon recommendation of the City Manager to appeal decision of the Code Compliance Officer that resulted in the issuance of the citation.
2) The procedures for appeal by administrative hearing of the citation shall be set for in the Code Compliance Ordinance.
3) If the named violator after notice fails to pay the civil fine or fails to timely request an administrative hearing before a Special Magistrate, the Special Magistrate shall be informed of such failure by report of the Code Compliance Officer. Failure of the named violator to appeal the decision of the Code Compliance Officer within the prescribed time period shall constitute a waiver of the violator's right to an administrative hearing before the Special magistrate. A waiver of the right to an administrative hearing shall be treated as an admission of the violation, and penalties may be assessed accordingly.
4) Any party aggrieved by the decision of a Special Magistrate may appeal that decision to a court of competent jurisdiction.

Sec. 1-108. Water Users to Accept Provisions of Division

No water service shall be furnished to any person by a public or private utility unless such person agrees to accept all the provisions of this division. The acceptance of waters service shall be in itself the acceptance of the provisions of this division.

Section 3. Severability. That if any section, subsection, sentence, clause,

phrase, work or amount of this ordinance shall be declared unconstitutional or invalid

by competent authority, then the remainder of the ordinance shall not be affected

thereby, and shall remain in full force and effect.

Section 4. Repeal of Conflicting Provisions. That all ordinances or parts of ordinances or resolutions of the County Code made inconsistent or in conflict herewith shall be and they are herby repealed in their entirety as there is conflict or inconsistency.

Section 5. Inclusion in Code. It is the intention of the Mayor and City Council and it is herby ordained that the provisions of this Ordinance shall

become and made a part of the City of Doral Code; that the sections of this Ordinance may be renumbered or relettered to accomplish such intentions; and that the word "Ordinance" shall be changed to "Section "or other appropriate word.

Section 6. Effective Date. This Ordinance shall become effective upon adoption on second reading.

The foregoing Ordinance was offered by Vice Mayor Cabrera who moved its adoption.

The motion was seconded by Councilman Van Name and upon being put to a vote, the vote was as follows:

Mayor Juan Carlos Bermudez	Yes
Vice Mayor Peter Cabrera	Yes
Councilmember Michael DiPietro	Yes
Councilwoman Sandra Ruiz	Yes
Councilmember Robert Van Name	Yes

PASSED AND ADOPTED upon FIRST READING the 13th day of June, 2007.

PASSED AND ADOPTED upon SECOND READING the 8th day of August, 2007.

JUAN CARLOS BERMUDEZ, MAYOR

ATTEST:

BARBARA HERRERA, CITY CLERK

APPROVED AS TO FORM AND LEGAL SUFFICIENCY
FOR THE SOLE USE OF THE CITY OF DORAL:

JOHN J. HEARN, ESQ., CITY ATTORNEY